Shorter

INDOOR ROWING TRAINING GUIDE

version 2

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The Indoor Rowing Training Guide, version 2, was written by Terry O'Neill and Alex Skelton.

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Preface

We are constantly being asked for training advice, be it for a 2,000m race, rehabilitation or general fitness. As every personal trainer or fitness expert will tell you, prescribing training is not that simple. Level of fitness, training background, maximum heart rate, history of illness, time available to train and your own expectations are just a few of the factors that need to be considered when starting any training programme.

We developed the original Indoor Rowing Training Guide to address all these issues, and ultimately make sure you make the right training decisions. The The Shorter Indoor Rowing Training Guide, version 2 has built on the success of the first Guide and now includes sections on Nutrition and Diet, Psychological Preparation and has input from many top rowers and coaches. The The Shorter Indoor Rowing Training Guide, version 2 will help you whether you are training for a race or simply would like to achieve a more healthy lifestyle.

Although we can't anticipate every individual's requirements we aim to provide information on the basic principles involved in designing training programmes and, by including many and varied examples, guide anyone in constructing an individual programme suited to their own personal needs.

The Concept2 website is also of great benefit and includes some useful information about technique and training as well as information on competitions, distance award schemes and a message board so you can contact other indoor rowers. Concept2 also has an electronic newsletter you can subscribe to on-line.

The Indoor Rower is an incredibly versatile and adaptable machine and this guide will help you plan your exercise with renewed confidence - knowing that you're doing what's best for you.

If you have any comments on this guide and if there's anything you think should be in any future editions, please contact us either by phone on 0115 945 5522 or email us at info@concept2.co.uk

Please note that this is an abridged version of the Indoor Rowing Training Guide, version 2, designed togive the essential information in an easy to handle book. To download or purchase the full version visit the Concept2 website at concept2.co.uk or call on 0115 945 5522.

WARNING: The information provided within this guide is not intended to be a substitute for medical advice. Many of the programmes featured involve demanding physical exercise. We strongly recommend that you check with your doctor prior to commencing any of the programmes to ensure that you are physically able to undertake such exercise. Concept2 Ltd accepts no responsibility for illness or injury resulting from the use of this guide.

Contributors

Terry O'Neill

Terry O'Neill has been involved in rowing for fifty years, thirty of which have been as a coach. He started in the sport as a coxswain and went on to row competitively before taking up coaching after being involved in a car accident. Since then he has been employed by the Inner London Education Authority as a fitness instructor, qualified as a weight lifting instructor and went on to qualify at the National College of Physical Education. He also holds the Gold, Silver and Bronze coaching awards from the Amateur Rowing Association (ARA).

Terry was appointed coach to the Great Britain men's lightweight squad in 1979, who went on to win the Lightweight Eight at the World Rowing Championship in 1980. By 1987 he had moved to coaching the men's heavyweight squad, specifically the Heavyweight Eight at the 1988 Olympics in Seoul. He continued coaching at an international level culminating in being the head coach for sculling for the Atlanta Olympics in 1996. He then moved into coach education as assistant director of the FISA International Coaches Course and was sent to Ecuador to run a coaching course for the Olympic Solidarity movement.

Terry lived in Spain between 1991 and 1994 where he coached at the Olympic Rowing Centre in Banyoles and served on the Barcelona Olympic Regatta Committee. He started working at Concept2 in 1999 and continues to coach and advise on all aspects of rowing and indoor rowing.

Alex Skelton BSc(hons), PGCE

Alex Skelton was educated at Loughborough University where he completed his undergraduate degree in Sports Science and went on to complete a PGCE in Physical Education. He worked as a teacher specialising in the teaching of anatomy and physiology and exercise physiology for A-level until 2002. Alex has competed in and coached basketball at national level and also swam at a national level. He has been involved with rowing since 1996.

Celia and Keith Atkinson

Celia and Keith Atkinson MBE are founder members of the Concept2 Education Team. Both are graduates of Durham University and retired teachers. Keith was Head of a Nottinghamshire comprehensive school and has a fifty-year association with rowing as competitor, ARA Gold Award Coach, FISA International Umpire and President of Nottingham Boat Club. Despite having MS, he has won two Bronze medals at the World Indoor Rowing Championships in Boston.

Celia and Keith have been involved in developing all aspects of the Concept2 Education Programme since its inception.

Contents

Section 1 :

Before and After Exercise

Exercise Guidelines

Before you start on your training programme it's important to understand, and abide by, the health and safety procedures involved in indoor rowing. Therefore please take time to read through this section carefully. That way you can avoid any unnecessary problems or injuries and get the most out of your programme, both in terms of performance and enjoyment.

Effective Exercise

The American College of Sports Medicine makes the following recommendations for the quality and quantity of training for developing and maintaining cardio-respiratory fitness in healthy adults:

- The activity should be one that uses large muscle groups, is maintained continuously and is rhythmical or aerobic in nature.
- The duration should be from 20 to 60 minutes, of continuous activity.
- Training should be regular; three to five times a week.
- The intensity of training should raise the heart rate to 60 to 85% of maximum heart rate (MHR).
- Strength training of moderate intensity should be added twice a week.

Safe Exercise

Indoor rowing is a safe and beneficial form of exercise. If you observe a few simple safety procedures, you can sustain an effective fitness programme with minimal risk. However, before you start, check through these routine precautions for your safety and comfort:

Personal Well-Being

- It's wise to have a health check before starting an exercise programme. **You should never exercise if unwell**.
- Always warm up, cool down and stretch thoroughly before and after each training session (see Warm Up, Cool Down, and Stretching in Section 1 : Before and After Exercise).
- It's important to warm up the muscles with some light rowing before you start stretching. If required wear a tracksuit (or equivalent) to help keep the muscles warm.
- Take time to develop good technique before increasing training intensity (see Section 2 : Technique on the Indoor Rower).
- When beginning an exercise programme don't overdo it; start slowly and build up gradually.
- Drink plenty of water during and after exercise. Don't wait until you are thirsty.
- Ensure you train at an appropriate intensity. We recommend you base your training intensity on your heart rate (see Training Intensity in Section 3 : Physiology).
- Keep a training log to help set realistic goals and targets and plan future programmes of work (see Training Log in Appendix).

Machine Protocol

- Check the handle, seat and monorail are clean.
- Adjust the damper setting to give the correct drag factor for your workout (see The Damper Lever and Drag Factor in Appendix for an explanation of how the damper works).
- Place the handle in the handle hook before securing your feet.
- Adjust the footrests. If you have long legs, you may need to lower the footrests. Fasten the straps securely.
- Sit slightly towards the back of the seat.
- Pull straight back with both hands. Do not row with one hand.
- Do not twist the chain, pull from side to side or let go of the handle whilst rowing.
- Keep clothing, hair and fingers away from the seat rollers.
- When you finish your exercise, place the handle in the handle hook, then, after releasing your feet, return the handle to rest against the chain guide/monitor support.
- Always ensure that the machine is properly maintained.

Warm Up

The aim of a warm up is to prepare the athlete both physically and mentally for exercise. When starting exercise, the body begins to release adrenalin, which increases the heart rate and causes dilation of the capillaries in the muscles. This has the dual function of increasing the temperature and elasticity of the muscles to help prevent injury and improve the speed at which oxygen can be transported around the body. The increased temperature allows the enzymes required for the muscular contraction to function more efficiently. Warm ups also make us more alert as the increased body temperature allows nerve impulses to travel more quickly, improving the reaction time. There are also psychological benefits of a warm up, especially if you are superstitious and perform the same routine every time you exercise or compete.

Training Warm Ups

The warm up necessary for training sessions will depend on the type of work involved in the session. The lower the intensity the less time required to warm up. This also applies to time taken in the cool down. This should be gentle rowing with heart rate at twice your resting heart rate.

Table 1.1

Warm-up/Cool Down Times for Training Sessions

Type of Session	Warm-up	Cool Down
UT2	5-8 mins	5-8 mins
UT1	8-10 mins	8-10 mins
AT	10-12 mins	10-12 mins
TR	12-15 mins	12-15 mins
AN	15-20 mins	15-20 mins

Competition Warm Ups

Pre-competition warm ups should prepare you for maximum intensity exercise. For this reason they should start with a gentle warm up row until your heart rate is twice your resting rate. At this point you should stretch the muscles required in the competition. Once this is done, return to gently rowing until your heart rate has returned to twice your resting level. Once you have reached this point you should include a number of high intensity bursts; these should be no longer than ten strokes in length and you should do no more than four bursts in total. The time between bursts should be governed by the time it takes your heart rate to return to normal warm up level. Finally a 13 to 15 stroke start should conclude the work, then row gently until your heart rate has returned to warm up level.

Cool Down

The cool down, like the warm up, is a very important part of each training session and competition. The purpose of the cool down is maintaining light, continuous exercise to allow your body to pump oxygen around the fatigued muscles. This will help to remove the lactic acid that has built up in the muscles during exercise. A cool down reduces blood pooling in the muscles, which can lead to dizziness, and can also limit the soreness experienced in the muscles during the days after strenuous exercise. A good cool down should consist of five to 15 minutes of light continuous exercise followed by stretching.

Stretching

The stretching that you do in the warm up and cool down has different purposes. In the warm up stretching allows a slight increase in flexibility that will result in improved performance and reduce the likelihood of injury. In the cool down stretching has the purpose of helping the body to remove some of the build up of lactic acid in the muscles and to improve flexibility. For these reasons the stretching in the warm up and cool down are of different durations.

Stretching Guidelines

- Regular stretching is important in improving flexibility and should be continued regardless of what stage of a training programme you have reached.
- It takes time to make significant progress with stretching exercises. Start by selecting just a few simple exercises to begin stretching each muscle group. Then, very gradually, increase the number of stretches and condition the muscles to greater degrees of stretch.
- It's important to warm up the muscles with some light rowing before you start stretching. If required wear a tracksuit (or equivalent) to help keep the muscles warm.
- Stretching should be done slowly, with no jerking or bouncing movements. Move into the stretching position slowly, continuing until a good stretch on the muscles is felt. Never stretch to the point of pain.
- In the warm up, after reaching a good stretch position, hold it for eight to 15 seconds. In the cool down this can be increased to 45 to 60 seconds. After each stretch release the body slowly from the position.
- The muscle being stretched should be as relaxed as possible. Stretch both sides of the body equally.
- Stretching exercises are not meant to be competitive. Do not compare progress with others as over-stretching can lead to injury. Just as important, the overly flexible should be excluded from the stretching programme.
- Although the ageing process brings about stiffness and increasing lack of mobility, regular stretching programmes, especially yoga, can bring about great improvement.

Warm Up Stretching

During the warm up ten to 15 minutes should be found to stretch. These stretches should last eight to 15 seconds in duration and should be focussed on the muscles that will be used during exercise. This will lead to improved performance and reduce the likelihood of injury.

Cool Down Stretching

After the cool down exercise has been completed a stretching session should be undertaken. This is the best time to improve your flexibility as the muscles are warm. If necessary a tracksuit or other loose clothing should be worn to maintain the high body temperature. During the cool down the focus is on improving flexibility by holding the stretches for 45 to 60 seconds.

Flexibility Training

If you find that your flexibility is not as good as it should be then introducing an extra flexibility session will help you make good improvements. This session does not need to follow exercise and can be done anywhere. Ensure that the muscles are warm by either exercising lightly or having a hot bath then stretch, holding each position for 45 to 60 seconds and repeating each stretch three to five times. This can be done in front of the TV or whilst reading.

Recommended Reading

More information about stretching can be found in the following books, available from good book shops;

- **Bob Anderson, Jean Anderson (Illustrator) : *Stretching***
  Shelter Publications, 2000
  ISBN: 0936070226
- **Pavel Tsatsouline, *Relax into Stretch : Instant Flexibility Through Mastering Muscle Tension***
  Dragon Door Publications, 2001
  ISBN: 0938045288
- **Michael J Alter, *Sport Stretch***
  Human Kinetics Europe Ltd, 1998
  ISBN: 0880118237

Stretching Exercises

Warm up/pre-exercise stretches should be held for eight to 15 seconds and should be done two to three times.

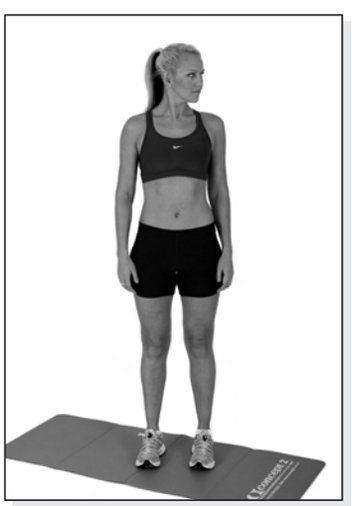
Cool down/post–exercise stretches should be held for 45 to 60 seconds and should be done two to three times.

In a flexibility session each stretch should be held for 45 to 60 seconds and should be repeated three to five times at least.

Where stretches can be done on both sides of the body only one side is shown. Ensure that you stretch both sides equally.

Neck extensors - flex the chin to the chest.

Scalenes - facing forwards, bring the ear towards the shoulder taking care not to lift the shoulder.



Upper Trapezius - turn the head to look over the shoulder, take care not to turn the body.

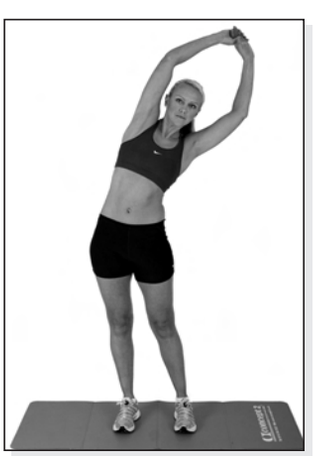
Triceps - place your right hand behind your neck. Use the left hand to apply pressure to the elbow, drawing the elbow behind the head. Ensure shoulders are relaxed.

Deltoids - reach across the front of the body, using the other arm to draw the arm across. Ensure that the shoulders are kept low.

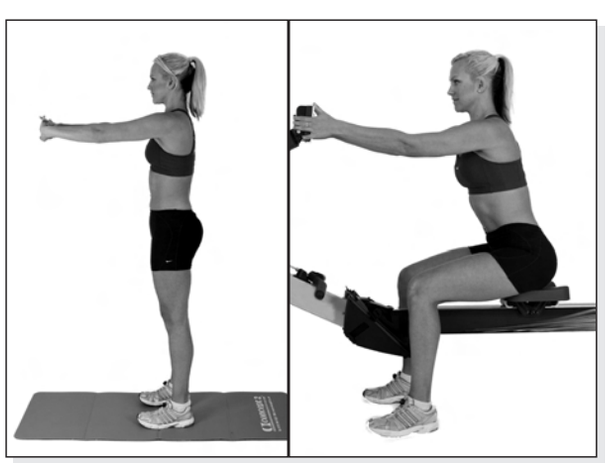
Pectorals/Biceps - stretch both arms behind you, keeping the elbows as straight as possible and the thumbs down. Ensure that you do not bend forwards.

Wrist flexors - with the elbow straight, use the other hand to apply the stretch by drawing the palm away from the floor, keeping the fingers straight.

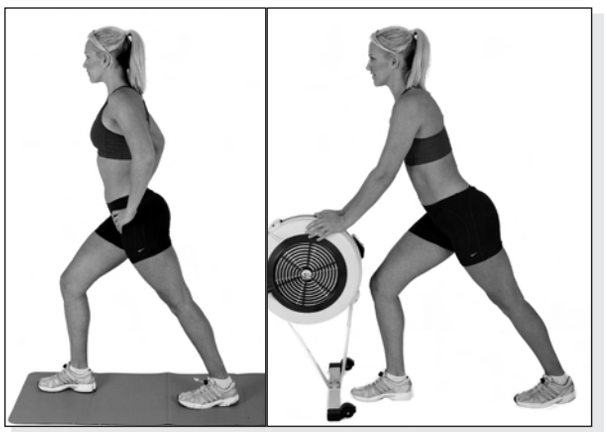
Wrist extensors - with the elbow straight, use the other hand to apply the stretch by bending the wrist, bringing the palm towards the floor, keeping the fingers straight.



Trunk stretch - standing with feet shoulder width apart, stretch right arm up towards the ceiling and over to the left, keeping the body in one plane.



Rhomboids - standing with feet shoulder width apart, hold your left hand with your right hand out in front of you, keeping your arms horizontal. Reach forwards, keeping the body upright, until you feel a stretch between your shoulder blades.

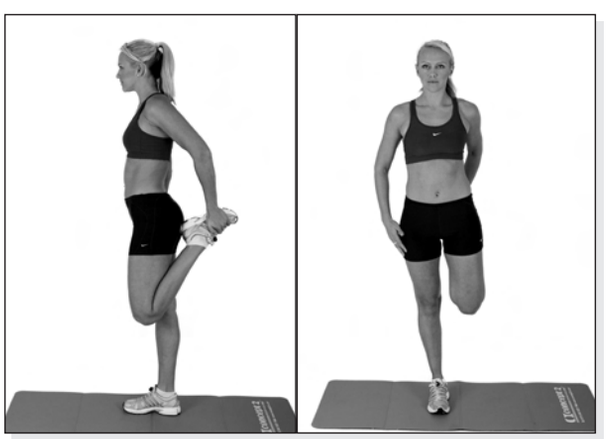


Gastrocnemius and Soleus - stand astride, stretch forward over the front leg, keeping the knee over the foot. Keep the back knee straight, keep both heels in contact with the floor.

Achilles - as for the Gastrochnemius and Soleus but bend the back leg bringing the knee towards the floor, keeping the heels on the floor.

Hip flexors Psoas/Quadriceps - stand astride, stretch forwards, dropping the left knee towards the floor, allowing the heel to raise. Keep the body upright.

Abductors - stand astride, with feet parallel, keep the left leg straight, bend the right knee and stretch until the knee is over the right foot.



Quads - keeping your inner thighs and knees together push your left foot into your hand and push the hips forwards.

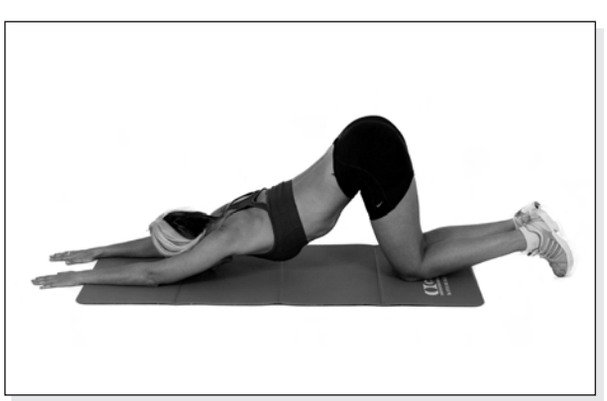
Hamstrings, Gastrochnemius (straight leg) **and Soleus** (bent leg) - stand astride with your front foot resting on your heel with your toes pointing upwards. Stretch forward over the front leg bending your back knee, keeping the heel in contact with the floor. Use your arms to support your weight on your bent knee. Keep your back flat and head up.

Hamstrings - sit on the floor, bend the right knee and slide heel towards the left inner thigh. Keep your back straight and flex from the hip, moving your torso towards the left thigh.

Hamstrings - lie flat on the floor, lift the right leg with the knee bent until the thigh is at a right angle to your body. Holding around the thigh, gently straighten the leg until you feel the stretch. The left leg should be bent with foot flat on the floor.

Hamstrings - keeping the back flat, reach over towards the right foot, feeling the stretch in the back of the right thigh.

Glutes/Piriformis – lie flat on your back with the left knee bent. Place the right heel on the left knee. Take hold around the left thigh and draw up towards your chest.



Rhomboids and Latissimus Dorsii - kneel on all fours, arms straight in front and spread slightly apart. Lower your chest to the floor, keeping the pelvis still.

Erector Spinae - lie on your back with knees bent; feet on the floor, grasp around your knees and pull your thighs towards your chest.

Pectorals, Obliques & Hamstrings - lie on your back with your arms out to the sides. Bend the right knee and move it to the left. Gently straighten the right knee until you reach the point of tension. Keep the head, shoulders and arms flat on the floor.

Pectorals, Obliques & Glutes - as previous stretch but grasp the right knee with the left hand and gently let it rotate across the body and onto the floor. Keep the head, shoulders and arms flat on the floor.

Rectus Abdominus - lie face down, place your hands under your shoulders, fingers pointing forwards. Straighten your arms gently until you feel resistance. Stretch your shoulders and chin forward.

Piriformis, Buttock & Lateral Torso - sit upright, place your left foot flat on the floor and place the right elbow behind the left knee. The left hand should provide support behind the body. Twist your upper body towards the left hand.

Section 2 :

Technique on the Indoor Rower

Technique

The definition of technique is "The skill required for the mastery of a task". Identifying the task is simple with indoor rowing because the task is to cover a given distance in the shortest time.

This doesn't mean that the people who produce the best times on the rowing machine have the best technique. Good technique has to account for efficiency measured by the performance when compared to the potential capacity of the athlete.

So good technique on the Indoor Rower is the ability to convert potential into performance. Developing good technique is carried out in three phases. The first phase is to develop the motor skills to master the sequence of movements, this is the cognitive phase of learning. Muscles respond to electrical impulses from the brain carried via the nervous system. Repeating a movement establishes a strong neurological pathway, which carries these tiny impulses. Breaking the rowing stroke down into its component parts and carrying out each segment slowly until it is mastered is the best method of establishing this pathway. This is followed by joining the segments together, gradually building up to the full stroke cycle.

During the development of motor skills there is no consideration to load; this comes next and is known as the functional stage. Here the muscles become familiar with the load, range and speed that they are required to work at and how it relates to other working muscles.

The final phase is the autonomous phase and here the muscles know their role with respect to the outcome task and movements become automatic.

Often, when people arrive at this stage, they think that this is all the work they need to do on technique. To some extent this is true in that, like riding a bike, once learned you never forget it. However, knowing how to ride a bike and winning the Tour de France are not the quite the same thing. Technique and not just fitness must be continually developed in order to realise your full potential.

You now have to go back to the beginning where we said that technique was converting potential into performance. As you continue to train your capacity increases and so now the emphasis of technique is to carry this increase in physical capacity over into faster times. The focus has now changed from the body position to the output display on the monitor. If it is not what you think it should be then you may need to go back and look at the movement to find where power is being lost.

Technical development is one of three crucial and interdependent aspects of training that require equal attention, with the other two being physical and mental development. Failure to exploit any one of these areas will result in underperformance. The interdependence is that first you have to make the decision and commitment to train to improve your physical condition. This is the mental area and mental strength is needed when things get tough and it is easier to quit.

Physical development will require hours of training, sweat and pain. Through technique you produce a result bringing all three areas together and reward for the effort and commitment.

It is easy to get hung up on the aesthetics of technique. Unlike ice skating, indoor rowing has no prizes for artistic content. On the other hand, poor technique won't win any prizes either. If you're looking at technique, keep focussed on the important areas. At the beginning of the stroke the legs come on early and are driving the handle back. Make sure that the handle moves back at the same time as the seat so the legs are not just driving the rower back.

Check that the trunk is held firm so that the power developed on the footplate is transferred directly to the handle right through the Drive phase. Often rowers transfer stability from the trunk to the legs and use the trunk to supply power. This can go almost unnoticed at low intensity work but is very inefficient. Although the upper body is responsible for over 50% of the stroke length the legs are responsible for 70% of the total power. This is because the load is at its greatest at the beginning of the stroke and decays to the finish. Good technique matches up the most powerful muscle groups in the legs to the greatest load and the faster muscles in the arms to the lighter but faster Finish.

Because you cannot realise potential without sound technique you can use pace as a technique tool. In all the training bands set yourself a target pace and try to stick to the recommended stroke rate, which can only be achieved with good technique. If you can coincide pace, stroke rate and heart rate then you will be developing all three areas simultaneously: mental, physical and technical.

Recommended Reading

Concept2, *Technique DVD & website (concept2.co.uk/training/technique*

Frequently Asked Questions on Technique

answered by Terry O'Neill

Why is it that pictures taken at the World Indoor Rowing Championship reveal rowing forms (i.e. technique) that my Concept2 manuals and video would illustrate as being incorrect. Am I misinterpreting your guidelines?

The technique advocated by Concept2 in our manuals and video is based on sound biomechanical principles. For the majority of rowers following this method will produce the best results. However, there will be variation for a number of reasons. There is one well-known rower who has won virtually every race he's been in but, if you look at his technique, there are many faults. He rows with bent arms and doesn't sit square on the seat. This was a result of an accident several years ago which resulted in a permanent bent arm which he physically cannot straighten. He has one leg shorter than the other and so he has adapted his technique to suit his body.

Scullers are used to rowing the oars in an arc and so when they get onto the Indoor Rower their elbows tend to go out at the finish. You would not teach this on the machine because there is no angular element to the stroke, however, if the user of the machine's main aim is to perform on the water you would not want to change this characteristic.

Finally, the pulling of the 'oar,' or handle, to the chin. This stems from the belief that the extra length will give better results and although this extra long pull may initially result in the split time coming down, there will be an extra energy cost to the rower making the stroke less efficient overall. It also puts more stress on the back increasing the likelihood of injury.

I've been sliding forward until my calves kiss the backs of my thighs and I've been bending forward far enough for the handle to finish up just about under the monitor. I thought I was achieving correct posture. I'm now told that I have been sliding too far forward, thus depriving myself of the power in

my legs, and that I have been swinging forward too far. What is the disadvantage to sliding too far?

If you overcompress the legs at the catch you put yourself at a mechanical disadvantage. You should compress the legs until the shins are vertical and the angle of the body should be around 30° (this will be when the body touches the thighs). Don't let your knees splay out too far as it is more efficient to pass the load through the centre of the joint, so keep your legs as parallel as possible.

This is an 'ideal' technique but there will always be variation caused by different body builds and flexibility. For example, if someone has a very strong upper body and relatively weak legs that person may be better off using a long body swing and short leg drive to compensate.

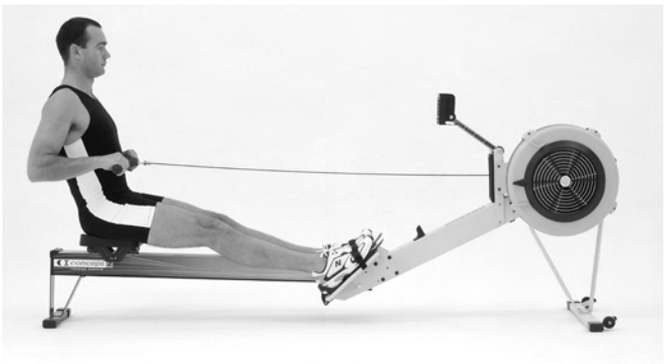
I know that my legs are more powerful than my arms and form an important component of the drive, but I don't think that I'm getting all of the power and efficiency from my leg drive that I should. What can I do to improve this?

There are a couple of exercises you can try. As you come forward think about the weight shifting on the foot towards the toes and also the compression of the legs, like squeezing down a coil spring. When you come up onto your toes release the spring. This is to make sure you take the beginning of the stroke with the legs.

The other exercise is, from the beginning of the stroke, keep the arms straight and just push off of the footplate moving back a couple of inches but making sure that the handle moves the same distance as the seat. Gradually increase the leg drive keeping the arms straight all the time, using them as a connection to the handle only. Do not pull the handle into the body.

When using the Indoor Rower I take the catch with bent arms. This is due to my knees being in the way and having to reach around them. I have lowered my feet to the bottom setting but still have the problem. I am 6'4", which is not tall for a rower. I also have the habit of rowing slumped but, when I sit up I find I am not drawing the handle in a straight line as the height of the chain is below my finish point (just below the chest). How can I put this right?

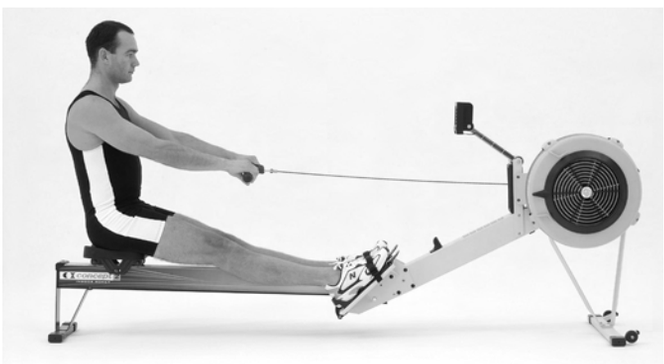
Although you are right to say that 6'4" is not exceptionally tall for a rower, the key is the ratio of leg to trunk length, regardless of height. If your legs are really long then at the beginning of the stroke they will be right up under your chin, even at the bottom setting of the footplate. If you slump, this will further aggravate the situation. If your elbows are bent out rather than down, your knees can come up between your arms. Try this; as you come off the finish sit tall and think about lifting your chest and reaching over your knees. To achieve this straighten the arms, lean slightly forward and allow the knees to come up into the space between your arms until your chest touches your thighs, keeping the arms straight. Then push the legs down out of the space and use the upper body in the second half of the stroke.



THE FINISH

Lean back slightly, legs flat, handle drawn to the body.

Forearms horizontal.



Arms extend

The arms are relaxed and extend away from the body.

Body rocks forward

The body rocks forward from the hips.

1/4 Slide

AFTER the arms have fully extended and the body rocked forward, slide forward maintaining arm and body position.

1/2 Slide

Continue to slide forward, maintaining arm and body position.

3/4 Slide

Continue to slide forward, maintaining arm and body position.

Full Slide - The Beginning

Shins vertical with body pressed up to the legs. The arms are straight and relaxed.

The position should feel comfortable.

THE DRIVE

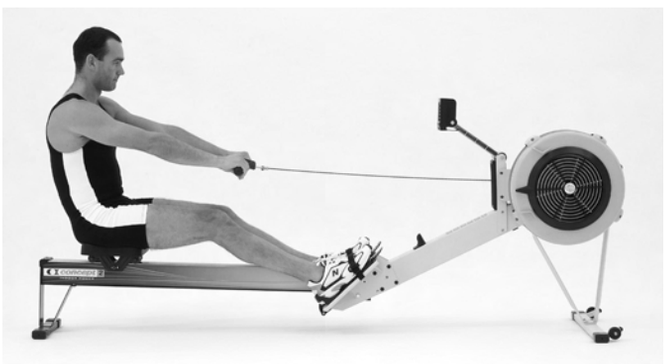
The Start of the Drive

The legs push down and the body begins to lever back.

The Drive continued

The legs continue to push as the body levers back.

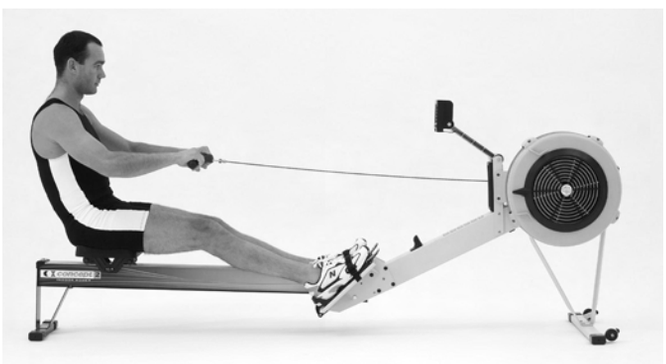
The arms remain straight.



Body levers back

The legs continue to push as the body levers back.

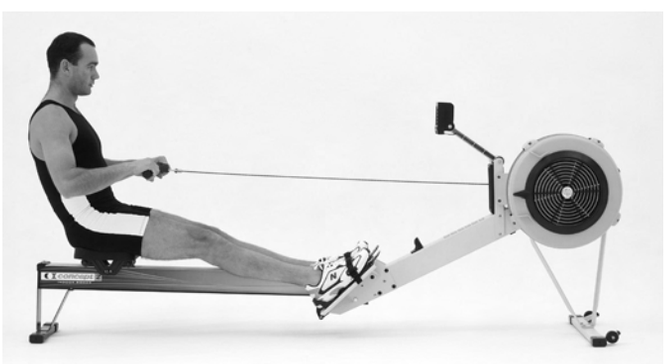
The arms remain straight.



Start using the arms

The body stops levering back.

The arms draw the handle past the knees to the body.



Draw the arms back to the FINISH

Holding the back in position draw the handle to the chest.

Technical Faults and Solutions

Correct technique is essential for efficient rowing and to reduce the risk of injury. Here are some of the most common errors, with the reasons they are inefficient, and solutions to help you prevent or correct any problems.

Fault

Solution

1. Rowing with bent arms

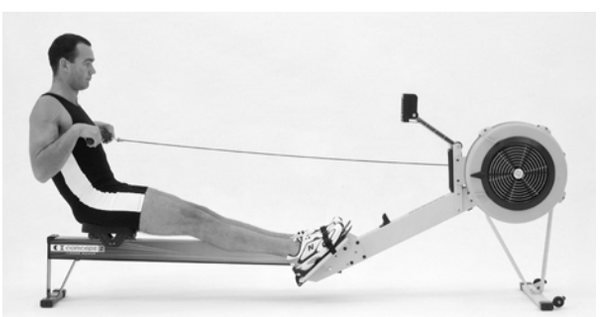
When the arm supports a load in one position the muscle remains contracted. Contraction expels blood from the muscles reducing the oxygen supply, increasing lactic acid build up and hastening fatigue.

The rower starts the Drive by pulling with the arms rather than pushing with the legs.

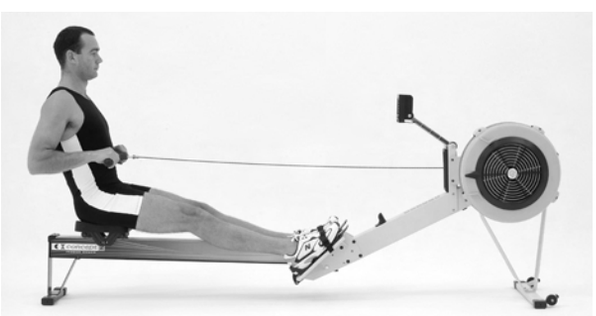
The Drive should start by pushing the legs and bracing the back with the arms fully extended and relaxed. The arms connect the legs and the back onto the handle.

2. Pulling up too high and rowing with bent wrists

Work can be carried out more efficiently and the risk of injury reduced when the load passes through the centre of joints.



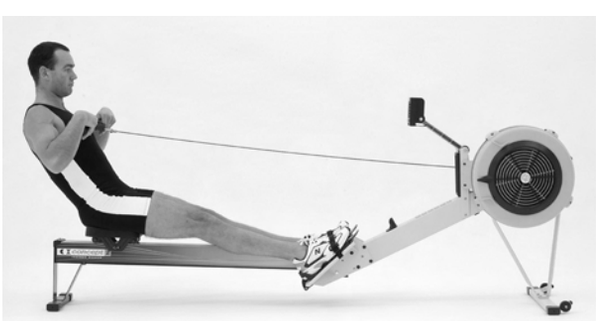
At the Finish the rower pulls the handle up too high causing the wrists to be bent.



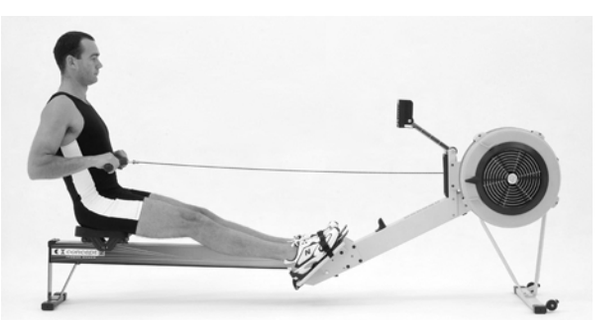
Always row with FLAT wrists. Check the hands at each stage of the Drive.

3. Pulling up too high and leaning back too much

Leaning back too far requires a great deal of energy to swing the body back through the upright position. The energy costs are greater than any gains through rowing a longer stroke.



At the Finish of the stroke the rower pulls the handle up too high and leans back too far.



Draw the handle into the body. The wrists should be flat with elbows drawn past the body, forearms horizontal.

Fault

Solution

4. Slide shooting

The legs are the most powerful muscles in the body and are used to start the acceleration of the flywheel, which represents the greatest load. Any movement of the seat should result in a corresponding movement of the handle or the legs are not being used to the greatest effect.

The legs push away too early, the back is not braced and so the power is not transferred onto the handle.

The legs begin the drive and the body moves back with straight arms transferring the leg power onto the handle.

5. Using the back too early

Using the back too early means that the weaker muscles are taking on the greater load and the stronger muscles are used when the load has decreased.

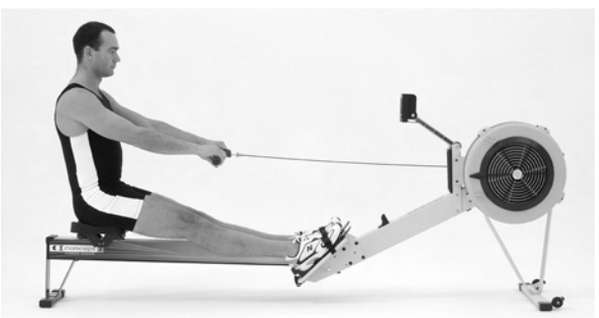
The rower starts the Drive by swinging the body back rather than pushing the legs. This results in a weak movement.

The legs begin the drive and the body levers back with the arms fully extended and relaxed.

6. Knees up too early

At the beginning of the stroke you need to be balanced and in control in order to develop maximum power. If the recovery sequence of hands, body then slide is not carried out correctly then this will mean a last minute adjustment at the beginning of the power phase, throwing you off balance and out of control.

On the Recovery the rower slides forward before the handle has extended past the knees. The hands either hit the knees or they are lifted up to clear the knees.



The Recovery sequence - hands, body, then slide. AFTER the arms have fully extended and the body has rocked forward, slide forward, maintaining the arm and body position.

Fault

Solution

7. Over reaching

Over reaching at the beginning of the stroke places the lower back at maximum flexion. If you then load it up there is a risk of tissue damage in this area.

The body stretches too far forward. The shins may be past the vertical. The head and shoulders tend to drop towards the feet. The body is in a weak position for the Drive.

The shins are vertical. The body is pressed up to the legs. The arms are fully extended and relaxed, body tilted slightly forward. This position should feel comfortable.

8. Body too tense. Grip on handle too tight

The only muscles that should be contracted are those directly involved in moving the flywheel. Any muscles in the shoulders and neck that are not directly involved will just drain energy if tensed.

Teeth are clenched, shoulders hunched and the rower is gripping the handle too tightly.

RELAX! Relax the shoulders down, unclench the teeth and relax the jaw. Keep a LIGHT hold on the handle.

9. Pulling the body to the handle

If you pull the body towards the handle there is an energy cost but it will not add anything towards moving the flywheel.

At the Finish, the rower, instead of pulling the handle to the body, pulls himself forward to the handle.

At the Finish the rower leans back slightly, holds the legs down and draws the handle to the body using the upper body as a firm platform.

Section 3 :

Physiology

Training Intensity

With improved knowledge of the energy systems that we use during exercise we can now move away from the "no pain, no gain" approach to training that has been prevalent, even recently, in some sports training. Exercise physiology has come a long way in the last fifty years and is now a much more exact science, capable of providing individuals with training programmes specific to their requirements. This section of the Training Guide aims to outline how varying the intensity of training can be used to bring about specific improvements in fitness with a much lower risk of illness or injury than the "no pain, no gain" philosophy. For all but the most experienced elite athletes the best way of monitoring training intensity is by ensuring that the heart rate is in the correct training zone. In order to do this we must have an understanding of resting heart rate, maximum heart rate and the difference between them - the heart rate range, the aerobic threshold and the anaerobic threshold, so that the correct training zones can be calculated.

Resting Heart Rate (RHR)

The heart, along with all of the other major organs in the body, is controlled directly by the autonomous nervous system; this means that we have limited conscious control over them. The heart responds directly to the demands placed upon it by the functions of the body. During rest the majority of blood flow is to the brain and major organs. To be able to identify the energy requirements of exercise and the correct training bands for heart rate we need to have a baseline; the resting heart rate. This can be measured by taking your heart rate as soon as you wake up, even before getting out of bed. Keeping a record of your resting heart rate can also help monitor your immune system thereby preventing over training and minimising the likelihood of getting ill. This is because your resting heart rate becomes elevated when your immune system is struggling to fight off infection. If you notice an unexplained rise in RHR of more than six to eight beats per minute then you should not train until it has returned to normal.

Maximum Heart Rate (MHR)

Maximum heart rate will vary depending on what you are doing to bring your heart rate up. Running will elicit a higher maximum heart rate than rowing which in turn will elicit a higher maximum than swimming. This is due in part to the fact that runners are upright and so the heart has to overcome the gravitational pull; rowers are seated and so the effects of gravity are reduced and swimmers are prone further reducing the gravitational pull. It is important to know what your maximum heart rate is as it enables you to calculate the correct training bands for heart rate. One method of calculating MHR is to use the equation MHR = 220 – age, but this can be very inaccurate, having an error of ±15/20 beats per minute (BPM). A more accurate method of finding your MHR is given in Physiological Tools in Section 3 : Physiology.

Heart Rate Range (HRR)

Heart rate range is determined by subtracting the resting heart rate from the maximum heart rate. When training bands are identified by percentages of heart rate, it is percentage of the HRR that is referred to. This value is then added to the RHR to give the training heart rate.

The Aerobic Threshold

Exercise brings about an increase in lactic acid in the blood, which at rest would be around 1mmol. The aerobic threshold is defined as a blood lactate concentration of 2mmols. This normally occurs at approximately 60% of maximum heart rate and is the lowest intensity that we regularly train at.

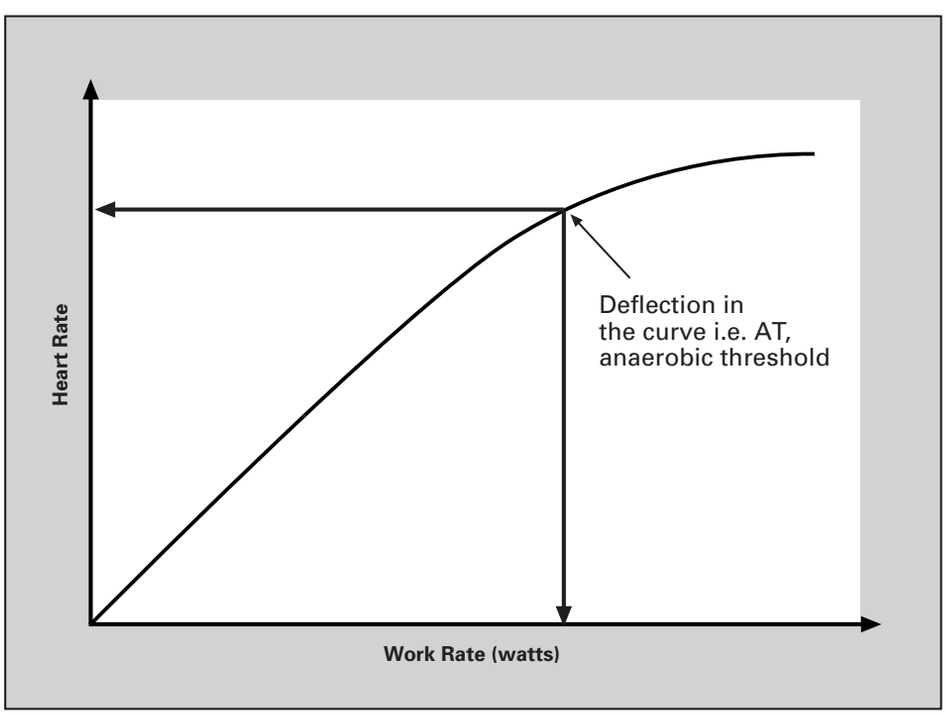
The Anaerobic Threshold (AT)

The anaerobic threshold is measured at 4mmols. At this point the lactic acid production is at the maximum level at which it can be metabolised and so it starts to accumulate in the working muscles, greatly reducing their efficiency. Anaerobic threshold is frequently measured as a percentage of aerobic capacity or VO_2 max and can be anywhere in the range of 50% to 85% of VO_2 max depending on fitness.

Because the heart has a limit on how fast it can beat there comes a stage where any further increase in demand for oxygen cannot be met. At this point there is a deflection in the heart rate/work rate graph (see below). The rate of increase slows down and eventually plateaus out at heart rate maximum. Many physiologists identify this point of deflection as the anaerobic threshold and exercise carried out above this level is anaerobic.

Training in this band has a greater effect on the development of the heart than training at a lower intensity. The development of muscular efficiency continues at a higher intensity but because training in this band is more physically demanding than aerobic training it cannot be sustained. Consequently although muscular efficiency is being trained at a higher rate it is for less overall time and therefore may not yield the same benefits.

For people with limited time to train, exercise within this band will have the greatest short-term effect.



Training Heart Rate

Training heart rates are divided into bands. These bands are determined by four key physiological points; resting heart rate, maximum heart rate, heart rate at aerobic threshold and heart rate at anaerobic threshold. In an unfit person the anaerobic threshold can occur as low as 50% of maximum heart rate but in a highly trained athlete this can be as high as 85% of maximum heart rate.

When starting out on a training regime, either from scratch or after several years of no regular exercise, then the simple method of determining your training heart rate can be used. This simply requires you to subtract your age from a nominal figure of 220, which represents maximum heart rate. You then apply the relevant percentage referred to in the training programmes to this figure. Any errors in this method will be on the safe side but as you get fitter you may want to use the heart rate range method.

If you have been exercising regularly you should calculate your maximum heart rate using the test in Physiological Tools in Section 3 : Physiology and then calculate your training bands accordingly.

Training Bands

Training heart rates are divided into five bands, determined by the RHR, MHR, aerobic threshold and anaerobic threshold. The five training bands can be divided into aerobic and anaerobic. The aerobic bands, utilisation training 2 (UT2) and utilisation training 1 (UT1), rely solely on the aerobic system and form the foundation of most training programmes. In these bands the main fuels are carbohydrate and fat, the percentage of each is dependent on the length of the exercise period. The anaerobic bands, anaerobic threshold (AT), oxygen transport (TR), and anaerobic (AN) combine the full output of the aerobic system with varying input from the anaerobic system. The fuel for these bands is carbohydrate.

The table below illustrates the relationship between the training bands and stroke rate. It describes how you may feel during the training and the training effect of working within each band.

Table 3.1

Training Bands					
Band	**Type of Work**	**% MHR**	**Rate (SPM)**	**What it is good for**	**How you feel**
UT2	Utilisation 2. Light aerobic, low intensity work. Sustainable and fat burning.	55-70	18-20	General CV fitness.	Relaxed. Able to carry on a conversation.
UT1	Utilisation 1. Heavy aerobic work using more oxygen.	70-80	20-24	Higher level of CV fitness.	Working. Feel warmer. Heart rate and respiration up. May sweat.
AT	Anaerobic Threshold. Harder work. On the aerobic limit. Pushing into anaerobic area.	80-85	24-28	High level of CV fitness. Building mental and physical tolerance.	Hard work. Heart rate and respiration up. Carbon dioxide build up. Sweating. Breathing hard.
TR	Oxygen Transportation. Working hard. Unsustainable for long periods.	85-95	28-32	Developing oxygen transport to the muscles under stress. Increasing cardiac output.	Stressed. Panting. Sweating freely.
AN	Anaerobic (without oxygen). Short bursts of maximum effort. Unsustain-able. Burning carbohydrate.	95-100	32+	Anaerobic work. Increasing speed. Accustoming the body to work without oxygen.	Very stressful. Gasping. Sweating heavily.

Notes

SPM = strokes per minute

%MHR = percentage of maximum heart rate

CV = cardiovascular

The different training bands use differing amounts of carbohydrates and fats as their primary source of fuel. Table 3.2 below gives a rough indication of the fuel usage at different intensities of exercise. Remember that this is only a rough guide as the percentage of fat versus carbohydrates used during exercise is dependant on duration and fitness as well as intensity.

Table 3.2

Relationship between Exercise Intensity and Energy Source

Exercise Intensity %MHR	Heart Rate (bpm)	% Carbohydrate	% Fat	Length of time at required intensity
65-70	130-140	40	60	60-90 mins
70-75	140-150	50	50	30-60 mins
75-80	150-160	65	35	15-30 mins
80-85	160-170	80	20	10-15 mins
85-90	170-180	90	10	4-6 mins
90-95	180-190	95	5	90 secs-4 mins
100	190-200	100	-	45-60 secs

Notes

Example 20 year old, MHR = 200

Frequently Asked Questions

answered by Terry O'Neill

I have been following the Concept2 website advice for weight management. By taking 41 (my age) from 220 for my maximum heart rate I get 179 but recently achieved 185 bpm in my hill sprint training. My resting heart rate is 42 to 44.

Using the figure 179 I take 65% to get a work rate of 116 bpm. In order to achieve this I have to row at rate 28 to 30 instead of the 18 to 20 as recommended in the Training Guide. What am I doing wrong?

Your maximum heart rate will depend on what you are doing. Hill sprints will initiate a much higher maximum heart rate than indoor rowing. If you want to find your maximum heart rate on the Indoor Rower refer to the test in Physiological Tools in Section 3 : Physiology.

The percentage of heart rate that you should work at is with respect to your heart rate range. You determine this by subtracting your resting heart rate from your maximum heart rate. Multiply this by the percentage you require and add your resting heart rate on again. This will give you an accurate idea of the correct heart rate for that training zone.

You should not be too concerned about the stroke rate you use to achieve your training zones. This is a throwback to water rowing before heart rate monitors were common, when rowers controlled the intensity of training by using stroke rate. It is much more important to achieve the correct heart rate than the suggested stroke rate.

Why do we need to train in different training bands and why can't you just train as hard as you can for as long as you can?

When I first took up coaching the national team back in the late 70s we used three training bands. Then they were called steady state, tempo and interval training. For steady state read UT1, for tempo read anaerobic threshold. Interval training was based around a series of 500m pieces.

Following a programme based on these three bands the crew I coached in 1980 won the World Championships and set a world best time that stood for nine years. The athletes in the crew all had full time jobs and trained four evenings a week and twice on Saturday and Sunday.

It would be a brave coach that suggested turning back the clock to this type of programme to full time athletes that form the current national team. The nearest thing that I got to it was a couple of years ago when I helped a local club. The first thing I did was cut the number of sessions per week by removing all early morning weekday sessions. The reason was that these sessions were not focused because of the pressure to finish in time for work. The quality of the evening session was poor because the athletes were not getting enough sleep and arriving for training tired. When I suggested dropping the morning sessions I could see from the expression on their faces they were thinking "Who is this bloke?" However, they did as I asked and went on to win at Henley, which was their aim.

With full time athletes tiredness is not such an issue as they are able to rest between sessions. This is because they have more time to train so training fills up the time they have available. The rational used is that the training can be more specific and to achieve this the number of training bands are expanded to five or in some cases seven.

Identifying various bands isn't that different from training as hard as you can for as long as you can. Low intensity work is carried out over a longer period and if you went off too hard you would not be able to complete the session. But if you mean why don't you make each session flat out then the answer is you would only be training at one point on a continuum which ranges from low intensity aerobic work to high intensity anaerobic work.

The two extremes of training could also be called the endurance end and the strength end of the continuum. You will find that there will be some strength gains from endurance training and some endurance gains from strength training.

We identify bands by blood lactate levels and this is relevant to training programmes for rowing over 2,000m. Blood lactate levels may not be relevant to someone training for a marathon as marathon runners may not be able to create significant levels of lactate. It is relevant to rowers because there are two reasons why you will be unable to continue to exercise, one is you will run out of fuel and you can do this through aerobic work. This will happen to athletes involved in prolonged aerobic activities such as the ironman triathlon, if they fail to refuel as they go. The other reason is that through high intensity work you have an accumulation of lactate to a point where it changes the pH of blood from a normal alkaline 7.3 to an acidic 6.8. In this case calcium, which is the bonding agent in the actomyosin complex (part of the contractile unit of the muscle), is broken down and muscles can no longer function. This can be clearly seen in an event like the 400m hurdles where as the runners approach the finish line they appear to be running in treacle and stop immediately they cross the line. The total event lasts for less than a minute so there is no way the athlete has run out of fuel.

Lactate accumulation will also be the limiting factor in a 2,000m flat out row. The energy costs are about 400 calories, which in itself is not too high considering that a human has a capacity of around 10,000. However, this is the maximum consumption over a period of 24 hours and the rate of expenditure for a 2,000m piece is around ten times the sustainable rate which is why it is such a physical challenge.

The main objective of a training programme is to increase the amount of usable energy before the debilitating effects of lactate accumulation. Therefore you need to know at what training intensity this occurs (anaerobic threshold).

Because lactate is constantly present in the bloodstream, we also need to establish what amount is there as a result of the basal metabolism plus normal activity and what level we can expect from exercise that will bring about the desired training effect (aerobic threshold). These two points have been identified as 4 and 2mmols respectively. Then there are the training bands above the anaerobic threshold, the first at 6mmols and then above. We need to train in these bands to develop a tolerance to lactate and improve the metabolic resynthisis.

Recommended Reading

- **McKardle, Katch and Katch, *Exercise Physiology: Energy Nutrition and Human Performance***
  Lippincott Williams and Wilkins, 2001
  ISBN: 0781725445
- **Wilmore and Costill, *Physiology of Sport and Exercise***
  Human Kinetics Europe Ltd, 1999
  ISBN: 0736000844

Section 4 :

Creating a Bespoke Training Programme

Section 4 : Creating a Bespoke Training Programme

This section of the training guide explains the basic principles of training and how to structure a training year. It provides all the information you need to create a bespoke training programme for you or your athletes, if you are a coach. When designing your own training programme you must decide your goal for the end of the programme and then, if possible, use one of the preset programmes in the next section of the guide to help you avoid missing anything out. Alternatively you can use the interactive programme to create a programme suitable as desired and then rearrange it to suit your own commitments.

Periodisation of Training

Most athletes, and elite athletes especially, start their preparation for a major event many months in advance (in the case of preparations for the Olympics this can be years in advance). Without breaking down the training into small manageable chunks they would very quickly become demotivated, and even if they did not, they would not easily be able to tell if they were improving or not. For this reason, training programmes are divided into small manageable sections called training cycles that can be varied in order to work different energy systems and to offset the problems of boredom.

There are three different types of training cycle. The macro-cycle is the longest of the cycles and can be up to a year in length. This is obviously too long a cycle to maintain concentration and improvement so this is broken down into four to eight week blocks called meso-cycles. This is becoming a more manageable size but is broken up to even smaller one to two week cycles called micro-cycles.

A stepped or wave approach to the meso-cycles has been found to be more efficient than a linear or continuous method of training. The wave principle requires that a training load increase is followed by a decrease to allow adaptation to take place in the body. An example is set out below:

If you have 18 weeks to the competition, then you have one 18 week macro-cycle that can be divided into 3 x 6 week meso-cycles. Your next step is to determine the training aim during each of the meso-cycles. Depending on your current level of fitness, you may decide to focus on general endurance during the first meso-cycle. This will mean that the majority of the training during this phase will be long intervals of 20 to 40 minutes low intensity work.

During the second meso-cycle the intensity should increase and the quantity decrease. This means the work intervals will become shorter, six to ten minutes, and the power output and heart rate will increase.

The third meso-cycle would be more specific race preparation. In the case of a 2,000m race the work intervals would be focused on part of the race e.g. 4 x 1,000m pieces or 12 x 250m. This meso-cycle concludes with a period of seven to ten days of tapering.

Structuring the Year

Serious competitors divide the year into four training periods; transition, preparation, pre-competition and competition. This enables them to be at their peak when required. The table below illustrates the training periods and their objectives for a twelve-month training programme.

Table 4.1

Training Periods & Objectives of a 12 month Training Programme

Preparation (27 weeks)	**Pre-Competition (9 weeks)**	**Competition (12 weeks)**		**Transition (4 weeks)**
Development of general physical capacity, strength and cardiovascular (CV) fitness. Development of good technique. Mentally, athlete improves concentration to maximise technical improvement and build confidence for the coming competition.	Training becomes more specific. Athlete continues to work on good technique and mental preparation.	Intensity of training increases which, if unchecked, can lead to breakdown in technique. Identify weaknesses and work on them during low intensity sessions. This is the time to develop tactics and strategy for competition, as well as to stabilise competition performance.	**Taper Period** (the last seven to ten days of the Competition Period) Intensity and duration of training is dramatically reduced to allow the body to fully recover from the intense training of the Competition Period. Athlete focuses on race strategy and pre-race warm up, keeping the sessions short. This is also an opportunity to polish up technique.	Rest! This is the time for complete mental and physical relaxation and can include holidays. A minimal level of activity should be maintained using cross-training techniques. Time for evaluation, and to set objectives for the next year.
Stretching and psychological preparation are important components of all training periods				

Notes

i. Although the table reads left to right, to periodise your training you must work back from the date of your main competition.

ii. Transition period: four weeks after the main competition.

iii. Competition period: From the date of the competition you wish to peak at count back 12 weeks (4 x 3 week cycles). The last seven to ten days of this period will be a taper.

iv. Pre-competition period: Count back a further nine weeks (3 x 3 week cycles).

v. Preparation period: The remaining 27 weeks.

vi. To check how you are progressing, and the effectiveness of your training, you should keep a training log and do some baseline tests on a regular basis (see Baseline Tests in Section 13 : Tests).

The next table sets out how you should plan your training if you have six to 48 weeks before your major competition. The table is used by working out how many weeks you have till the competition, and then reads from the left hand column across. For example, if you have six weeks till competition this whole time should be spent in the period called competition and is all competition preparation. If you have 24 weeks until competition then you should do a three week preparation cycle followed by nine weeks of pre-competition and 12 weeks of competition.

Table 4.2

Training Periods (weeks)			
Weeks until Race	**Preparation**	**Pre-Competition**	**Competition**
6	-	-	6
7	1	-	6
8	2	-	6
9	3	-	6
10	3	1	6
11	3	2	6
12	3	3	6
13	3	4	6
14	3	5	6
15	3	6	6
16	3	4	9
17	3	5	9
18	3	6	9
19	3	4	12
20	3	5	12
21	3	6	12
22	3	7	12
23	3	8	12
24	3	9	12
25-48	3-27	9	12

Notes

The last seven to ten days of the competition period will be a taper, however, if you only have six weeks until competition a shorter taper of three to seven days would be adequate.

Tapering

For seven to ten days prior to an important competition you should taper off your training. Some people think that to reduce training doses at this time will lead to a loss of fitness but this is not true. Training is a combination of overload and super-compensation. This means that during exercise the body is brought to the point of exhaustion and, during the recovery period, the body recuperates to a point of greater capacity than before. The super-compensation period lasts for seven to ten days after the end of a training regime and so any fears of a loss of condition are groundless. The best use of this time is to focus on race strategy, getting the pre-race warm-up right, and polishing up technique. It is important to avoid the build up of lactic acid close to competition. The longest single piece of high intensity work should not exceed 90 seconds. A couple of these at the beginning of the final week should be okay, cutting back to bursts of 30 seconds in the days immediately preceding competition. If preparing for a 2,000m race, we recommend that the total number of hard strokes during the whole of the tapering period should not exceed 300.

An example of a week of tapering is shown below. This is the last week before a 2,000m race and assumes that you have trained conscientiously for the event. You should find that you are able to do much more work than is on the schedule. This is a good sign but do not give into the temptation to do too much. You are tapering and should be getting rested and ready for your race, not making yourself overtired.

Table 4.3

Tapering Based on Training Sessions per Week								
3 sessions or less	No Taper Needed							
4 sessions	1x3'TR	2x1.5'AN	3x45secsAN	RACE				
5 sessions	25'UT2	1x3'TR	3x1.5'AN	45secsAN	RACE			
6 sessions	30'UT2	1x3'TR	2x8'UT1	3x1.5'AN	45secsAN	RACE		
7 sessions	1x15'UT1	5'AT	1x3'TR	20'UT2	2x2'TR	3x45secsAN	RACE	
8 sessions	OFF	1x15'UT1	5'AT	1x3'TR	20'UT2	2x2'TR	3x45secsAN	RACE

Notes

i. 25'UT2 means row for 25 minutes at UT2 heart rate.

ii. 15'UT1 means row for 15 minutes at UT1 heart rate.

iii. 5'AT means row for five minutes at AT heart rate.

iv. 3'TR means row for three minutes at TR heart rate.

v. 2x1.5'AN means row for one and a half minutes at AN heart rate, then repeat once fully recovered.

Body Adaptation

Perhaps surprisingly, a training session itself does not actually bring about an improvement in performance. It is during periods of rest and recovery that the body adapts to demands made on it from exercising. As your physical performance improves, you can increase the training volume that in turn will change the type of training you do. People training four or five times a week will benefit from a high percentage of high intensity sessions, whilst those training twice a day may only complete 20 to 30% of their total training programme at high intensity. An individual's heart rate at different workloads will define the training intensity, therefore people training at the same workload could be training at different intensities. Training sessions that cause the heart rate to increase to near maximum are high intensity. Sessions that can be completed at moderate heart rate are low intensity.

To ensure the desired adaptation takes place a number of factors need to be considered:

- Training needs to be regular to stimulate adaptation in the body.
- There needs to be enough time between sessions for the adaptation to take place.
- The amount of training needs to be increased as adaptation takes place.
- The training programme needs to be specific to the needs of the individual.
- Training needs to be tailored to the specific physical demands of a particular sport.
- There must be a system for monitoring progress within the programme.

Recovery Time Between Intervals

Full recovery between intervals can be considered as taken place when the heart rate has fallen to warm up level (twice resting rate).

The intensity of interval-training can be increased by working to 90% or even 80% of full recovery.

Example - resting heart rate = 60bpm. Warm up rate = 120bpm

100% recovery = 120bpm, then repeat.

90% recovery = 132bpm, then repeat.

80% recovery = 145bpm, then repeat.

Reduced recovery is most effective at the beginning of an intensive interval-training period when intensity takes precedence over quality. Close to competition quality takes precedence over intensity and therefore full recovery is advisable.

Structuring the Programme

The number of training sessions per week you are prepared to commit to will have a profound impact on the mix of training you will do. In simple terms, if you are only training three or four times a week the intensity of your programme will be proportionally higher than if you are training seven or eight times a week.

To make some sense of this Table 4.4 outlines a suggested mix of training based on the number of training sessions per week, the training bands and the period of the year that you are training in. Table 4.5 illustrates the type of work, stroke rate and heart rate appropriate to each training band.

By referring to tables 4.1, 4.2, 4.4 and 4.5 and using the wave principle of training you will be able to start constructing your own programme.

The table overleaf shows how to divide the training sessions between the different training bands, depending on how many sessions you wish to train each week.

Table 4.4

Training Bands Mix (Based on Training Period & Training Sessions per Week)										
	Preparation		**Pre-Competition**			**Competition**				
No. of Sess.	**UT2**	**UT1**	**UT2**	**UT1**	**AT**	**UT2**	**UT1**	**AT**	**TR**	**AN**
3	-	3	-	1	2	-	-	-	2	1
4	-	4	-	2	2	-	-	1	2	1
5	1	4	1	2	2	-	1	1	2	1
6	2	4	1	2	3	-	1	1	2	2
7	3	4	1	3	3	-	1	2	2	2
8	4	4	2	3	3	1	1	2	2	2

Notes

Select the number of sessions you wish to train each week, taking note of the number of sessions required in each training band.

Table 4.5

Work in Each Training Band						
1	**2**	**3**	**4**	**5**	**6**	**7**
Band	**Time**	**Type of Work**	**Recovery**	**Example**	**% MHR**	**SPM**
UT2	60-90 mins	Long intervals 20-90 mins	10-20%	60 mins steady state	55-70	18-20
UT1	30-60 mins	Long intervals 10-30 mins	25-50%	3 x 10 mins: 5 mins rest	70-80	20-24
AT	18-24 mins	Medium intervals 6-10 mins	50%	3 x 6 mins: 3 mins rest	80-85	24-28
TR	12-18 mins	Short intervals 2-5 mins	100%	6 x 2 mins: 2 mins rest	85-95	28-32
AN	9-12 mins	Bursts 45-90 secs	100%	6 x 90 secs: 90 secs rest	95-100	Max

Notes

i. Band: the training band in which the athlete is working.
ii. Time the duration of training within each training band.
iii. Type of Work: the type of work for the training session.
iv. Recovery: the recovery time, expressed as a percentage of the work time.
v. Example: an example of the work.
vi. %MHR: the percentage of maximum heart rate appropriate for the type of work.
vii. SPM: strokes per minute.

Section 5 :

Preset Programmes

Interactive Training Guides

In addition to the training programmes presented in this guide Concept2 have created a number of others including some interactive programmes which you can tailor to your specific requirements. These include a 2,000m race programme, a Fast-Track Fitness programme and a Weight Loss programme. Please go to concept2.co.uk/training for more information, where you can also view and download the full Training Guide.

Programme Guidelines

The basic conditioning, 20 minute fitness and 40 minute fitness programmes are for those who achieving general health and fitness is their priority, whilst the 2,000m race training, marathon training and cross-training programmes are designed with a specific competition focus in mind. Each programme indicates a target group, but you must use your best judgement with regard to how you are coping and progressing. If you find that the work is hard, and you are having difficulties maintaining the programme, ease off and consider working at a gentler pace, perhaps on another programme. Equally, if you find that it's too easy, look at moving on to the next level.

Beginning Your Programme

Before embarking on any exercise programme remember the following:

- Ensure you are medically able to start exercising. Have a fitness assessment first.
- Always listen to your body and be prepared to take a rest if you are tired. Rest is a very important part of the training process as this is when your body adapts to training loads.
- Take care not to overdo it in the early stages and never train when you are ill.
- Work within the limits of your MHR (see Training Intensity in Section 3 : Physiology).
- Don't become a slave to the programme.
- Exercise safely (see Exercise Guidelines in Section 1 : Before and After Exercise).
- If you suffer from a bad back or experience back pain when using the rowing machine you should ensure that you are using the correct technique and limit yourself to doing 20 minutes continuous rowing at a time before taking a break to stretch. Make sure you include extension stretches like the Rectus Abdominus stretch shown in Stretching in Section 1 : Before and After Exercise. If your back pain persists consult your doctor or physiotherapist. If the session in longer than 20 minutes break it into 20 minute parts. This is not affecting your training as the effect is cumulative.
- All of the training set out in the guide refers to use of the Concept2 Indoor Rower. This does not mean that all of the sessions should be completed on the rowing machine. In order to maintain some variety in your training programme we recommend replacing some of the UT2 and UT1 sessions with the same intensity work done either running, cycling, cross-training or swimming.

Basic Conditioning

by Celia and Keith Atkinson

Target Group: Age 40+, or younger people who are unfit and have done little or no exercise.

Dr Fritz Hagerman, Professor of Physiology at Ohio University, USA and Chairman of FISA's* Rowing Sports Medicine Commission has written the following exercise programme for the Indoor Rower following research into the effects of exercise on adults who had led a largely sedentary lifestyle and had not exercised in years. The results were amazing. Starting with five one minute rows, with rests in between, the group worked on a step-by-step basis, gradually building up to a level of fitness which enabled them to row continuously for 30 minutes.

The basic conditioning programme is designed to be a gentle introductory training programme, setting an upper training intensity limit of 75% maximum heart rate (MHR) or a level at which conversation can be maintained, whichever is lower.

The programme can be adapted to your needs. For example; you can double the rest time or vary the steps (i.e. go from one minute to one and half minutes and from two minutes to two and half minutes) if you wish. What is necessary though is regularity - establish a routine of one day's work followed by one day's rest in the early stages.

* Fédération Internationale des Sociétés d'Aviron (FISA) - the world governing body for the sport of rowing.

Table 5.1

Step	Band	Row	Rest	Workload	Work Time
1	UT1	1' @ 75% MHR	30 secs	5 reps, adding another rep each workout until you can do 8, then go to next step.	5-8'
2	UT1	2' @ 75% MHR	30 secs	Same as step 1	10-16'
3	UT1	3' @ 75% MHR	30 secs	Same as step 1	15-24'
4	UT1	4' @75% MHR	30-60 secs	4 reps, adding another rep each workout until you can do 7, then go to next step	16-28'
5	UT1	5' @ 75% MHR	30-60 secs	Same as step 4	20-35'
6	UT1	Progressing to continuous rowing	-	Once you are comfortable with step 5 increase the time period for rowing more rapidly. For example, to 7.5 mins x 4, then 10 mins x 3, then 15 mins x 2, until you are rowing continuously for 20 mins, then add 2 mins each day until you reach 30 mins.	20-30'

Notes

Step 1 means row for one minute at up to 75% of your maximum heart rate (MHR), then rest for 30 seconds. Repeat so that you complete five repetitions altogether. When you feel capable add another repetition until you can comfortably complete eight repetitions then move to Step 2, and so on. Step 1 represents between five and eight minutes of exercise.

Table 5.2

Basic Conditioning Programme				
Step	**Stage 1**	**Stage 2**	**Stage 3**	**Stage 4**
1	5 x 1' UT1 20-24spm	6 x 1' UT1 20-24spm	7 x 1' UT1 20-24spm	8 x 1' UT1 20-24spm
2	5 x 2' UT1 20-24spm	6 x 2' UT1 20-24spm	7 x 2' UT1 20-24spm	8 x 2' UT1 20-24spm
3	5 x 3' UT1 20-24spm	6 x 3' UT1 20-24spm	7 x 3' UT1 20-24spm	8 x 3' UT1 20-24spm
4	4 x 4' UT1 20-24spm	5 x 4' UT1 20-24spm	6 x 4' UT1 20-24spm	7 x 4' UT1 20-24spm
5	4 x 5' UT1 20-24spm	5 x 5' UT1 20-24spm	6 x 5' UT1 20-24spm	7 x 5' UT1 20-24spm
6	4 x 7.5' UT1 20-24spm	3 x 10' UT1 20-24spm	2 x 15' UT1 20-24spm	20'UT1 20-24spm Keep adding 2' up to required total time

Notes

i. Move from one stage to the next only when you feel ready - there are no time restrictions.

ii. 5 x 1'UT1 20-24spm means row one minute at UT1 heart rate, at 20 to 24 strokes per minute, take 30 seconds rest then repeat till you have done it five times.

20 Minute and 40 Minute Fitness

by Celia and Keith Atkinson

In the 20 minute fitness and 40 minute fitness programmes the training periods have been defined as preparation, development and consolidation. The preparation period is the start up period, when you are getting used to a regular training regime; the development period should be started when you are happy that you've mastered technique and have established a regular exercise routine. You can then begin to work a little harder during each session. Provided progress is good you may wish to push on further into the consolidation period. The main changes are that the stroke ratings (strokes per minute or spm) will rise and the quality and intensity of the work will increase. In short, you will work harder and rate higher.

For those of you who become interested in competition, the preparation, development and consolidation periods can relate to the preparation, pre-competition and competition periods for 2,000m race training.

20 Minute Fitness

Target Group: People who have a limited amount of time for training.

The 20 minute fitness programme is based on the periodisation of training (see Periodisation of Training in Section 4 : Creating a Bespoke Training Programme), training heart rate (see Training Intensity in Section 3 : Physiology) and the training bands (see Training Bands in Section 3 : Physiology).

The session length, in terms of work, is up to 20 minutes but this does not include time for warm-up, cool down or stretching. Depending on the amount of rest you require, some sessions may overrun the allotted 20 minutes slightly.

This programme (Table 5.3) has been written for anybody who wishes to train from three to five times per week. If you train three times a week, follow the programme for sessions 1, 2 and 3. For four sessions add on Session 4, and for five sessions complete all sessions.

Notes for Table 5.3

i. 1 x 20' UT1 20spm means row for 20 minutes in your UT1 heart rate range at 20 strokes per minute.

ii. 2 x 8' UT1 20spm means row for eight minutes in your UT1 heart rate range at 20 strokes per minute, with a short rest of three to four minutes, then repeat.

iii. 6 x 1' AN 32spm means row one minute intervals in your AN heart rate range, with at least one to two minutes rest between each piece of work, repeat six times.

iv. 4 x 2'TR 30spm means row for two minutes in your TR heart rate at 30 strokes per minute with 30 to 90 seconds rest, repeat four times.

v. Sessions 1 to 3 are fairly hard workouts as they are designed for people only completing three training sessions each week. The less training you do each week the harder the individual sessions need to be so that cumulatively you are doing enough work for it to be beneficial. As you complete more sessions per week the training load of the extra sessions can be reduced. Therefore sessions 4 & 5 are lighter workouts. When completing more than three sessions a week we recommend you adjust the sequence of the sessions to give a more balanced mix of light and hard sessions throughout the week.

Table 5.3

20 Minute Fitness Programme, 3-5 Sessions per Week			
Session	**Light Week**	**Medium Week**	**Hard Week**
	PREPARATION PERIOD		
1	1 x 20′ UT1 20spm	1 x 20′ UT1 22spm	1 x 20′ UT1 24spm
2	2 x 8′ UT1 22spm	2 x 8′ UT1 23spm	2 x 8′ UT1 24spm
3	1 x 20′ UT1 20spm	1 x 20′ UT1 22spm	1 x 20′ UT1 24spm
4	2 x 8′ UT1 22spm	2 x 8′ UT1 23spm	1 x 20′ UT1 24spm
5	1 x 20′ UT2 18-20spm	1 x 20′ UT2 18-20spm	1 x 20′ UT218-20spm
	DEVELOPMENT PERIOD		
1	2 x 8′ AT 24spm	2 x 8′ AT 25spm	2 x 8′ AT 26spm
2	1 x 20′ UT1 20spm	1 x 20′ UT1 22spm	1 x 20′ UT1 24spm
3	3 x 5′ AT 26spm	3 x 5′ AT 27spm	3 x 5′ AT 28spm
4	1 x 20′ UT1 22spm	1 x 20′ UT1 23spm	1 x 20′ UT1 24spm
5	1 x 20′ UT2 18-20spm	1 x 20′ UT2 18-20spm	1 x 20′ UT2 18-20spm
	CONSOLIDATION PERIOD		
1	3 x 4′ TR 28spm	3 x 4′ TR 28spm	3 x 4′ TR 30spm
2	6 x 1′ AN 32spm	6 x 1′ AN 34spm	8 x 1′ AN 36spm
3	4 x 2′ TR 30spm	5 x 2′ TR 32spm	6 x 2′ TR 32spm
4	2 x 8′ AT 24spm	2 x 8′ AT 26spm	2 x 8′ AT 28spm
5	1 x 20′ UT1 20spm	1 x 20′ UT1 22spm	1 x 20′ UT1 24spm

40 Minute Fitness

Target Group: People who can devote up to an hour to a training session.

The 40 minute fitness programme is based on the periodisation of training (see Periodisation of Training in Section 1 : Before and After Exercise), training heart rate (see Training Intensity in Section 3 : Physiology) and the training bands (see Training Bands in Section 3 : Physiology).

The session length, in terms of work, is up to 40 minutes but this does not include time for warm-up, cool down or stretching. Depending on the amount of rest you require, some sessions may overrun the allotted 40 minutes slightly.

This programme (Table 5.4) has been written for anybody who wishes to train from three to five times per week. If you train three times a week, follow the programme for sessions 1, 2 and 3. For four sessions add on Session 4, and for five sessions complete all sessions.

Notes for Table 5.4

i. 1 x 20' UT1 20spm means row for 20 minutes in your UT1 heart rate range at 20 strokes per minute.

ii. 2 x 8' UT1 20spm means row for eight minutes in your UT1 heart rate range at 20 strokes per minute, with a short rest of three to four minutes, then repeat.

iii. 6 x 1' AN 32spm means row one minute intervals in your AN heart rate range, with at least one to two minutes rest between each piece of work, repeat six times.

iv. 4 x 2'TR 30spm means row for two minutes in your TR heart rate at 30 strokes per minute with 30 to 90 seconds rest, repeat four times.

v. Sessions 1 to 3 are fairly hard workouts as they are designed for people only completing three training sessions each week. The less training you do each week the harder the individual sessions need to be so that cumulatively you are doing enough work for it to be beneficial. As you complete more sessions per week the training load of the extra sessions can be reduced. Therefore sessions 4 & 5 are lighter workouts. When completing more than three sessions a week we recommend you adjust the sequence of the sessions to give a more balanced mix of light and hard sessions throughout the week.

Table 5.4

40 Minute Fitness Programme, 3-5 Sessions per Week			
Session	**Light Week**	**Medium Week**	**Hard Week**
	PREPARATION PERIOD		
1	1 x 30′ UT1 18spm	1 x 30′ UT1 20spm	1 x 30′ UT1 22spm
2	3 x 10′ UT1 20spm	3 x 10′ UT1 22spm	3 x 10′ UT1 24spm
3	2 x 15′ UT1 20spm	2 x 15′ UT1 22spm	2 x 15′ UT1 24spm
4	3 x 10′ UT1 22spm	3 x 10′ UT1 23spm	3 x 10′ UT1 24spm
5	1 x 30′ UT2 18spm	1 x 40′ UT2 18spm	1 x 40′ UT2 20spm
	DEVELOPMENT PERIOD		
1	3 x 7′ AT 26spm	4 x 7′ AT 26spm	4 x 7′ AT 28spm
2	2 x 15′ UT1 20spm	2 x 15′ UT1 22spm	2 x 15′ UT1 24spm
3	4 x 6′ AT 26spm	4 x 6′ AT 28spm	5 x 6′ AT 28spm
4	3 x 10′ UT1 22spm	3 x 10′ UT1 23spm	3 x 10′ UT1 24spm
5	1 x 40′ UT2 18spm	1 x 40′ UT2 20spm	1 x 40′ UT2 20spm
	CONSOLIDATION PERIOD		
1	5 x 3′ TR 28spm	6 x 3′ TR 28spm	6 x 3′ TR 30spm
2	2 x (6 x 1′) AN 32spm	3 x (6 x 45 sec) AN 34spm	3 x (6 x 45 sec) AN 36spm
3	6 x 2′ TR 30spm	2 x (4 x 2′) TR 30spm	2 x (4 x 2′) TR 32spm
4	4 x 6′ AT 26spm	4 x 6′ AT 28spm	5 x 6′ AT 28spm
5	3 x 10′ UT1 20spm	3 x 10′ UT1 22spm	3 x 10′ UT1 24spm

2,000m Race Training

Since its introduction, the Indoor Rower has played an important role as an indoor training and testing tool for rowers and indoor rowing is now an international sport in it's own right. The 2,000m test is used worldwide and provides coaches and athletes with a tool to monitor fitness and improvement.

Rowers, like most people, do not like being tested/examined and for this reason the 2,000m test is regarded by many as an unnecessary interruption to on-water training, and not an accurate reflection of on-water performance.

In the last 20 years the volume and intensity of rowing training has increased rapidly; top level club oarsmen and women expect to train more than 15 hours a week and international athletes well over 20. In most cases, the training cycle is building towards an annual event, or series of events. Given the level of commitment made, it makes sense to regularly check that the desired training effect is being achieved. Placing regular tests within the yearly cycle allows both the coach and athlete to monitor the athlete's performance gains and, where necessary, adjust the training programme to suit the individual's needs. If the athlete sees that they are making regular performance gains, their confidence improves and they gain a belief that the training they are doing is effective and return to it with renewed vigour. If there is no performance gain, it acts as a warning signal of either ill health, over-training or that the training programme is not suited to the individual. Whatever the answer, this can be addressed immediately rather than continuing to train, only to be disappointed when performance falls below expectations in competition.

For these reasons a testing procedure should be included in the training programme to fit into the end of each meso cycle, allowing performance gains to be monitored. This way, the testing does not need to interrupt on-water training, but will certainly benefit it. Whilst performance on the Indoor Rower does not directly reflect on-water performance between two people of different technical skill levels, where the skill level is the same, the athlete with the better 2,000m time on the Indoor Rower will inevitably win.

In this section we offer two different training programmes; the original and the interactive. The original programme offers a series of pre-set programmes for four, five or six sessions per week. The interactive offers a bespoke programme taking into account different fitness levels.

The original programme and the interactive programme vary in two ways:

1. The original programme does not take into account current fitness,
2. The interactive programme offers a suggested split for each training zone that can be used for either of the two programmes and is the best split expected for each training zone based on 2,000m time.

The Original 2,000m Training Programme

Target Group: Anyone training for a 2,000m race.

It doesn't matter whether you are an Olympic champion or a "first-timer" to the machine, if you commit yourself fully to a 2,000m race you will find yourself pushed right to your limit. That said, you will be far better equipped to cope with the physiological demands you are placing on your body if you prepare for the race in a systematic way. With this in mind we advise that if you've got less than six weeks to go to your race, and you've not been training, you should probably not go ahead. Tables 5.5 to 5.7 outline a series of pre-set programmes based on training four, five or six sessions per week.

To structure your own programme refer to Section 4 : Creating a Bespoke Training Programme.

Table 5.5

The Original 2,000m Training Programme: 4 Sessions per Week			
Session	**Light Week**	**Medium Week**	**Hard Week**
	PREPARATION		
1	2 x 20′ UT1 20spm	2 x 20′ UT1 22spm	2 x 20′ UT1 24spm
2	1 x 30′ UT1 22spm	1 x 40′ UT1 22spm	4 x 10′ UT1 24spm
3	3 x 10′ UT1 22spm	3 x 15′ UT1 22spm	3 x 20′ UT1 22spm
4	1 x 30′ UT1 20spm	1 x 30′ UT1 22spm	1 x 30′ UT1 24spm
	PRE-COMPETITION		
1	2 x 10′ AT 24spm	2 x 10′ AT 26spm	2 x 10′ AT 28spm
2	2 x 20′ UT1 20spm	2 x 20′ UT1 22spm	2 x 20′ UT1 24spm
3	3 x 6′ AT 24spm	3 x 6′ AT 26spm	3 x 6′ AT 28spm
4	3 x 10′ UT1 22spm	3 x 15′ UT1 22spm	3 x 20′ UT1 22spm
	COMPETITION		
1	3 x 4′ TR 28spm	3 x 4′ TR 30spm	3 x 4′ TR 32spm
2	9 x 1′ AN 32spm	9 x 1′ AN 33spm	9 x 1′ AN 34spm
3	4 x 6′ AT 24spm	4 x 6′ AT 26spm	4 x 6′ AT 28spm
4	6 x 2′ TR 28spm	6 x 2′ TR 30spm	6 x 2′ TR 32spm

Notes

i. Always err on the side of caution in any training regime. These training examples are a guide only and are not appropriate to everyone. You need to use caution and know your own limits when assessing your ability to cope with training doses. Beginners on a training regime of three or four sessions a week may not be able to cope with the above.

ii. To determine which training period you should be working in refer to Section 4, Tables 4.1 and 4.2.

Table 5.6

The Original 2,000m Training Programme: 5 Sessions per Week			
Session	**Light Week**	**Medium Week**	**Hard Week**
	PREPARATION		
1	2 x 20′ UT1 20spm	2 x 20′ UT1 22spm	2 x 20′ UT1 24spm
2	1 x 30′ UT1 22spm	1 x 40′ UT1 22spm	4 x 10′ UT1 24spm
3	1 x 60′ UT2 18spm	1 x 60′ UT2 18spm	1 x 60′ UT2 18spm
4	3 x 10′ UT1 22spm	3 x 15′ UT1 22spm	3 x 20′ UT1 22spm
5	1 x 30′ UT1 20spm	1 x 30′ UT1 22spm	1 x 30′ UT1 24spm
	PRE-COMPETITION		
1	2 x 10′ AT 24spm	2 x 10′ AT 26spm	2 x 10′ AT 28spm
2	2 x 20′ UT1 20spm	2 x 20′ UT1 22spm	2 x 20′ UT1 24spm
3	1 x 60′ UT2 18spm	1 x 60′ UT2 18spm	1 x 60′ UT2 18spm
4	3 x 6′ AT 24spm	3 x 6′ AT 26spm	3 x 6′ AT 28spm
5	3 x 10′ UT1 22spm	3 x 15′ UT1 22spm	3 x 20′ UT1 22spm
	COMPETITION		
1	3 x 4′ TR 28spm	3 x 4′ TR 30spm	3 x 4′ TR 32spm
2	9 x 1′ AN 32spm	9 x 1′ AN 33spm	9 x 1′ AN 34spm
3	3 x 10′ UT1 20spm	3 x 10′ UT1 22spm	3 x 10′ UT1 24spm
4	4 x 6′ AT 24spm	4 x 6′ AT 26spm	4 x 6′ AT 28spm
5	6 x 2′ TR 28spm	6 x 2′ TR 30spm	6 x 2′ TR 32spm

Notes

i. Always err on the side of caution in any training regime. These training examples are a guide only and are not appropriate to everyone. You need to use caution and know your own limits when assessing your ability to cope with training doses. Beginners on a training regime of three or four sessions a week may not be able to cope with the above.

ii. To determine which training period you should be working in refer to Section 4, Tables 4.1 and 4.2.

Table 5.7

The Original 2,000m Training Programme: 6 Sessions per Week			
Session	**Light Week**	**Medium Week**	**Hard Week**
	PREPARATION		
1	2 x 20′ UT1 20spm	2 x 20′ UT1 22spm	2 x 20′ UT1 24spm
2	1 x 30′ UT1 22spm	1 x 40′ UT1 22spm	4 x 10′ UT1 24spm
3	1 x 60′ UT2 18spm	1 x 60′ UT2 18spm	1 x 60′ UT2 18spm
4	3 x 10′ UT1 22spm	3 x 15′ UT1 22spm	3 x 20′ UT1 22spm
5	1 x 60′ UT2 20spm	1 x 60′ UT2 20spm	1 x 60′ UT2 20spm
6	1 x 30′ UT1 20spm	1 x 30′ UT1 22spm	1 x 30′ UT1 24spm
	PRE-COMPETITION		
1	2 x 10′ AT 24spm	2 x 10′ AT 26spm	2 x 10′ AT 28spm
2	2 x 20′ UT1 20spm	2 x 20′ UT1 22spm	2 x 20′ UT1 24spm
3	4 x 6′ AT 24spm	4 x 6′ AT 26spm	4 x 6′ AT 28spm
4	1 x 60′ UT2 18spm	1 x 60′ UT2 18spm	1 x 60′ UT2 18spm
5	3 x 6′ AT 24spm	3 x 6′ AT 26spm	3 x 6′ AT 28spm
6	3 x 10′ UT1 20spm	3 x 15′ UT1 22spm	3 x 20′ UT1 22spm
	COMPETITION		
1	3 x 4′ TR 28spm	3 x 4′ TR 30spm	3 x 4′ TR 32spm
2	9 x 1′ AN 32spm	9 x 1′ AN 33spm	9 x 1′ AN 34spm
3	3 x 10′ UT1 20spm	3 x 10′ UT1 22spm	3 x 10′ UT1 24spm
4	6 x 1.5′ AN 32spm	6 x 1.5′ AN 33spm	6 x 1.5′ AN 34spm
5	4 x 6′ AT 24spm	4 x 6′ AT 26spm	4 x 6′ AT 28spm
6	6 x 2′ TR 28spm	6 x 2′ TR 30spm	6 x 2′ TR 32spm

Notes

i. Always err on the side of caution in any training regime. These training examples are a guide only and are not appropriate to everyone. You need to use caution and know your own limits when assessing your ability to cope with training doses. Beginners on a training regime of three or four sessions a week may not be able to cope with the above.

ii. To determine which training period you should be working in refer to Section 4, Tables 4.1 and 4.2.

Additional Notes for Tables 5.5 - 5.7

i. 1 x 60' UT2 18spm means row for 60 minutes in your UT2 heart rate at 18 strokes per minute.
ii. 2 x 20' UT1 20spm means row for 20 minutes in your UT1 heart rate at 20 strokes per minute with enough rest to return to twice your normal resting heart rate before repeating.
iii. 3 x 6' AT 24spm means row for six minutes in your AT heart rate at 24 strokes per minutes with enough rest to return to twice your normal resting heart rate before repeating, until you have done it three times.
iv. 6 x 2' TR 28spm means row for two minutes in your TR heart rate at 28 strokes per minutes with enough rest to return to twice your normal resting heart rate before repeating, until you have done it six times.
v. 9 x 1' AN 34spm means row for one minute in your AN heart rate at 34 strokes per minutes with enough rest to return to twice your normal resting heart rate before repeating, until you have done it nine times.

The Interactive 2,000m Training Programme

Target Group: Anyone training for a 2,000m race.

To help you create your own training programme we have included the building blocks that are used to create the interactive 2,000m training programme that is available on the Concept2 website. This can be used either as an alternative to the original 2,000m race training programme set out in the previous section or simply to help you create your own programme. By starting with the programme that designates the nearest number of sessions a week to the number that you require you can also use this to give your training programme some flexibility. If you plan to do eight sessions per week but for some reason you know you will only be able to do six then you can look at the sessions that would be removed to create a six session per week programme and only complete those.

The programme below sets out 26 weeks of training. If you have less time to your competition then you will need to remove some of the weeks. The weeks are removed as follows; 13, 14, 15, 12, 11, 10, 16, 17, 18, 9, 8, 7. For example, to create a 22 week programme you remove the first four weeks from the list, these are weeks 13, 14, 15 and 12.

How to Use the Training Pace Guide

In order to get the best from the training programme follow the pace guide for the different training bands. Look at your current 2,000m time in the left hand column then follow across to the right for the target pace in each band. After six weeks retest your 2,000m time and reassess your pace.

Working at the recommended stroke rate will develop your technique and if you can combine stroke rate, heart rate and pace then you will develop both technical and physical efficiency.

Note: Rest between intervals can be calculated by using the information in Periodisation of Training in Section 4 : Creating a Bespoke Training Programme.

The training intensities in each band are based on your current 2,000m time. The figures indicated are at the top end of each band. UT1, AT, and TR training bands, can be identified as lying between the figure in the training band column and the figure in the column to the left.

At max pace, 2,000m is carried out at around 95% of maximum heart rate which is indicated here as the top end of the TR band (85% to 95% of MHR). Training in this band should be equal to or slower than the pace given in the TR column. The pace figure indicated in the AN band is 110% of 2,000m pace. Training in this band should be carried out at the pace shown in the AN column of the table or faster.

Table 5.8

2,000m Training Pace Guide

Current 2,000m Time	Pace		Stroke Rate				
			20-22	22-24	26-28	30-34	36-46
	Seconds	Watts	UT2	UT1	AT	TR	AN
5:40	85	570	1:38.0	1:34.0	1:35.0	≤1:25.0	≥1:22.0
5:44	86	550	1:39.5	1:35.0	1:35.0	≤1:26.0	≥1:23.0
5:48	87	532	1:40.5	1:36.0	1:35.0	≤1:27.0	≥1:24.0
5:52	88	514	1:41.5	1:37.0	1:35.0	≤1:28.0	≥1:25.0
5:56	89	496	1:43.0	1:38.0	1:35.0	≤1:29.0	≥1:26.0
6:00	90	480	1:44.0	1:39.0	1:35.0	≤1:30.0	≥1:27.0
6:04	91	464	1:45.0	1:40.0	1:36.0	≤1:31.0	≥1:28.0
6:08	92	449	1:46.0	1:41.0	1:37.0	≤1:32.0	≥1:29.0
6:12	93	435	1:47.0	1:42.5	1:37.5	≤1:33.0	≥1:30.0
6:16	94	421	1:48.5	1:43.5	1:38.0	≤1:34.0	≥1:31.0
6:20	95	408	1:50.0	1:45.0	1:39.0	≤1:35.0	≥1:32.0
6:24	96	395	1:51.0	1:46.0	1:40.0	≤1:36.0	≥1:33.5
6:28	97	383	1:52.0	1:47.0	1:41.0	≤1:37.0	≥1:35.0
6:32	98	372	1:53.5	1:47.5	1:42.5	≤1:38.0	≥1:36.0
6:36	99	358	1:54.0	1:48.0	1:43.5	≤1:39.0	≥1:37.0
6:40	100	350	1:55.0	1:49.0	1:45.0	≤1:40.0	≥1:38.0
6:44	101	340	1:56.0	1:50.0	1:46.0	≤1:41.0	≥1:38.5
6:48	102	330	1:57.0	1:51.5	1:47.5	≤1:42.0	≥1:39.0
6:52	103	320	1:58.5	1:53.0	1:48.5	≤1:43.0	≥1:40.0
6:56	104	311	2:00.0	1:54.5	1:50.0	≤1:44.0	≥1:41.0
7:00	105	302	2:01.0	1:56.0	1:51.0	≤1:45.0	≥1:42.0
7:04	106	294	2:02.0	1:57.0	1:52.0	≤1:46.0	≥1:43.5
7:08	107	286	2:03.5	1:58.5	1:53.0	≤1:47.0	≥1:44.0
7:12	108	278	2:04.5	2:00.0	1:54.0	≤1:48.0	≥1:45.0
7:16	109	270	2:06.0	2:02.0	1:55.0	≤1:49.0	≥1:46.0
7:20	110	263	2:07.0	2:03.0	1:56.0	≤1:50.0	≥1:47.0
7:24	111	256	2:08.0	2:04.5	1:57.0	≤1:51.0	≥1:48.5
7:28	112	249	2:09.0	2:05.0	1:58.0	≤1:52.0	≥1:49.0
7:32	113	243	2:10.5	2:06.0	1:59.0	≤1:53.0	≥1:49.5
7:36	114	236	2:12.0	2:07.5	2:00.0	≤1:54.0	≥1:50.0
7:40	115	230	2:13.0	2:09.0	2:01.0	≤1:55.0	≥1:51.0
7:44	116	224	2:14.0	2:10.0	2:02.0	≤1:56.0	≥1:52.5
7:48	117	219	2:15.0	2:11.0	2:03.0	≤1:57.0	≥1:54.0
7:52	118	213	2:16.0	2:12.0	2:04.0	≤1:58.0	≥1:55.0
7:56	119	208	2:17.0	2:13.0	2:05.0	≤1:59.0	≥1:56.0
8:00	120	203	2:18.0	2:14.0	2:07.0	≤2:00.0	≥1:57.0
8:04	121	198	2:19.0	2:15.0	2:08.0	≤2:01.0	≥1:58.0
8:08	122	193	2:20.0	2:16.0	2:09.0	≤2:02.0	≥1:59.0
8:12	123	188	2:21.5	2:17.0	2:10.0	≤2:03.0	≥1:59.5
8:16	124	184	2:23.0	2:18.0	2:11.0	≤2:04.0	≥2:00.0
8:20	125	179	2:24.0	2:19.0	2:12.0	≤2:05.0	≥2:01.0
8:24	126	175	2:25.0	2:20.0	2:13.0	≤2:06.0	≥2:02.0
8:28	127	171	2:26.0	2:21.0	2:14.0	≤2:07.0	≥2:03.0
8:32	128	167	2:27.5	2:22.0	2:15.0	≤2:08.0	≥2:04.0
8:36	129	163	2:29.0	2:23.0	2:16.0	≤2:09.0	≥2:05.0
8:40	130	159	2:30.0	2:24.0	2:17.0	≤2:10.0	≥2:06.0
8:44	131	156	2:31.0	2:25.0	2:18.5	≤2:11.0	≥2:07.0
8:48	132	152	2:32.0	2:26.5	2:20.0	≤2:12.0	≥2:08.0
8:52	133	149	2:33.5	2:28.0	2:21.5	≤2:13.0	≥2:10.0
8:56	134	145	2:35.0	2:29.5	2:23.0	≤2:14.0	≥2:11.5
9:00	135	142	2:36.0	2:31.0	2:25.0	≤2:15.0	≥2:13.0
9:04	136	139	2:37.0	2:31.5	2:25.5	≤2:16.0	≥2:13.5
9:08	137	137	2:38.0	2:32.0	2:27.5	≤2:17.0	≥2:14.0
9:12138	134	2:39.0	2:32.5	2:28.0	≤2:18.0	≥2:14.5	9:16 391
2:40.0	2:33.0	2:28.5	≤2:19.0	≥2:15.0		9:20	140128
2:41.0	2:33.5	2:29.0	≤2:20.0	≥2:15.5			

Table 5.9

The Interactive 2,000,m Training Programme								
Level 5 - Athlete. Trained regularly six to eight sessions per week for at least three years								
6-8 Sessions Per Week								
Week	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1 L	45'UT2	2x15'UT1	55'UT2	2x18'UT1	68'UT2	3x15'UT1	55'UT2	2x15'UT1
2 M	65'UT2	2x21'UT1	72'UT2	3x16'UT1	80'UT2	4x13'UT1	72'UT2	3x12'UT1
3 H	76'UT2	3x17'UT1	85'UT2	3x19'UT1	90'UT2	3x20'UT1	85'UT2	2x25'UT1
4 L	45'UT2	2x15'UT1	2x6'AT	3x12'UT1	2x7'AT	3x15'UT1	2x10'AT	3x12'UT2
5 M	65'UT2	2x24'UT1	4x5'AT	3x16'UT1	3x8'AT	3x18'UT1	2x12'AT	3x16'UT1
6 H	76'UT2	2x25'UT1	3x7'AT	3x19'UT1	3x10'AT	5x12'UT1	3x8'AT	3x18'UT1
7 L	**45'UT2**	2x15'UT1	2x8'AT	3x12'UT1	2x10'AT	3x15'UT1	2x9'AT	2x3'TR
8 M	65'UT2	3x14'UT1	2x9'AT	75'UT2	2x8' AT	4x14'UT1	2x7'AT	3x4'TR
9 H	76'UT2	3x17'UT1	3x7'AT	90'UT2	4x5'TR	4X15'UT1	3x8'AT	4x4'TR
10 L	45'UT2	2x15'UT1	2x8'AT	60'UT2	4x2'TR	3x12'UT1	2x9'AT	3x3'TR
11 M	65'UT2	3x15'UT1	2x10'AT	75'UT2	4x3'TR	3x15'UT1	2x10'AT	4x3'TR
12 H	75'UT2	4x15'UT1	3x8'AT	90'UT2	4x4'TR	4x12'UT1	3x10'AT	5x4'TR
13 L	**45'UT2**	2X15'UT1	2x8'AT	60'UT2	3x1'AN	3x15'UT1	2x8'AT	4x2'TR
14 M	65'UT2	3X15'UT1	2x10'AT	75'UT2	4x1.5'AN	4x12'UT1	3x7'AT	6x2'TR
15 H	75'UT2	5x12'UT1	3x10'AT	90'UT2	6x1'AN	5x12'UT1	3x10'AT	6x4'TR
16 L	45'UT2	2X15'UT1	2x9'AT	60'UT2	8x45sAN	4x14'UT1	2x10'AT	5x2'TR
17 M	65'UT2	3X15'UT1	3x10'AT	75'UT2	6x1.5'AN	3x12'UT1	3x8'AT	6x3'TR
18 H	75'UT2	4x15'UT1	4x8'AT	90'UT2	8x1'AN	2x15'UT1	4x9'AT	7x4'TR
19 L	**45'UT2**	2X15'UT1	2x10'AT	60'UT2	4x1.5'AN	3x12'UT1	3x8'AT	6x2'TR
20 M	65'UT2	3X15'UT1	3x12'AT	75'UT2	6x1'AN	3x15'UT1	3x10'AT	7x3'TR
21 H	75'UT2	5x12'UT1	5x8'AT	90'UT2	8x45sAN	5x12'UT1	4x10'AT	8X4'TR
22 L	45'UT2	2x15'UT1	2x10'AT	60'UT2	8x1.5'AN	3x12'UT1	2x7'AT	4x2'TR
23 M	65'UT2	3x15'UT1	3x8'AT	75'UT2	10x45sAN	3x15'UT1	3x7'AT	4x3'TR
24 H	76'UT2	4x15'UT1	4x8'AT	90'UT2	2(6x1')AN	4x15'UT1	2x10'AT	4x4'TR
25 T	50'UT2	2x12'UT1	6' AT	40'UT2	2x1.5'AN	2x15'UT1	4'TR	2x12'UT1
26 T	**OFF**	1x15'UT1	5'AT	1x3'TR	20'UT2	2x2'TR	3x45sAN	**RACE**

Notes:

i. The sessions in bold can be replaced by a 2,000m test to measure progress.

ii. Remove the light grey column to give seven sessions per week and move the tests to column 2.

iii. Remove the dark grey column to give six sessions per week.

Table 5.10

The Interactive 2,000,m Training Programme						
Level 4 - Trained. Followed a formal training programme of five sessions per week for at least two years.						
4-6 Sessions Per Week						
Week	**1**	**2**	**3**	**4**	**5**	**6**
1 L	30'UT2	2x12.5'UT1	36'UT2	2x15'UT1	45'UT2	3x12'UT1
2 M	42'UT2	3x11'UT1	48'UT2	2x20'UT1	54'UT2	3x15'UT1
3 H	51'UT2	3x14'UT1	57'UT2	4x12'UT1	60'UT2	5x10'UT1
4 L	2x12'UT1	10'AT	2x12'UT1	12'AT	2x15'UT1	2x8'AT
5 M	3x11'UT1	2x9'AT	3x13'UT1	2x8'AT	4x11'UT1	2x10'AT
6 H	3x14'UT1	2x10'AT	4x12'UT1	2x10'AT	5x10'UT1	3x7'AT
7 L	**50'UT2**	12'AT	3x10'UT1	12'AT	3x12'UT1	2x8'AT
8 M	2X15'UT1	2x8'AT	3x15'UT1	3x3'TR	3x13'UT1	2x10'AT
9 H	3X15'UT1	2x9'AT	5x10'UT1	5x2'TR	3x14'UT1	3x7'AT
10 L	57'UT2	2x12'UT1	2x13'UT1	2x4'TR	3x10'UT1	2x8'AT
11 M	3x11'UT1	2x10'AT	4x11'UT1	2x6'TR	4x10'UT1	2x9'AT
12 H	4X11'UT1	4x4'TR	3x17'UT1	3x6'TR	5x10'UT1	2x10'AT
13 L	**60'UT2**	3x3'TR	3x12'UT1	2x5'TR	3x13'UT1	2x8'AT
14 M	3x12'UT1	4x1.5'AN	3x15'UT1	4x3'TR	3x14'UT1	2x9'AT
15 H	4x12'UT1	6x1'AN	4x12'UT1	5x3'TR	3x15'UT1	2x10'AT
16 L	60'UT2	8x45s AN	2x15'UT1	5x2'TR	3x14'UT1	2x15'AT
17 M	2x18'UT1	6x1.5'AN	3x15'UT1	6x2'TR	3x15'UT1	3x8'AT
18 H	3x17'UT1	8x1'AN	3x17'UT1	8x2'TR	3x16'UT1	3x10'AT
19 L	**60'UT2**	8x1.5'AN	2x12'UT1	4x3'TR	3x15'UT1	2x9'AT
20 M	3x15'UT1	10x45sAN	2x15'UT1	5x3'TR	3x16'UT1	3x8'AT
21 H	3X17'UT1	2(6x1')AN	2x18'UT1	4x5'TR	3x17'UT1	3x10'AT
22 L	60'UT2	4x1.5'AN	2x13'UT1	3x3'TR	3x10UT1	4x8'AT
23 M	2x20'UT1	6x1'AN	3x13'UT1	4x3'TR	2X16'UT1	2x12'AT
24 H	3x15'UT1	8x45s AN	4x13'UT1	4x4'TR	2x18'UT1	3x12'AT
25 T	50'UT2	3x1'AN	2X10'UT1	2x3'TR	2x9'UT1	1x10'AT
26 T	30'UT2	1x3'TR	2x8'UT1	3x1.5'AN	3x45sAN	**RACE**

Notes:

i. The sessions in bold can be replaced by a 2,000m test to measure progress.

ii. Remove the light grey column to give five sessions per week and move the tests to column 2.

iii. Remove the dark grey column to give four sessions per week.

Table 5.11

The Interactive 2,000,m Training Programme					
Level 3 - Fit. Taken part in exercise at least three sessions per week for the past 12 months.					
4-5 Sessions Per Week					
Week	**1**	**2**	**3**	**4**	**5**
1 L	38'UT2	1x20'UT1	2x12'UT1	2x15'UT1	2x10'UT1
2 M	40'UT2	2x14'UT1	2x16'UT1	2x18'UT1	2x15'UT1
3 H	45'UT2	2x17'UT1	2x19'UT1	4x10'UT1	2x18'UT1
4 L	30'UT2	2x7'AT	2x10'UT1	2x7'AT	2x12'UT1
5 M	45'UT2	2x8'AT	2x14'UT1	2x8'AT	2x16'UT1
6 H	50'UT2	2x9'AT	3x13'UT1	3x7'AT	3x15'UT1
7 L	**30'UT2**	2x7'AT	2x12'UT1	2x7'AT	3x12'UT1
8 M	2x14'UT1	2x8'AT	4x2'TR	2x7'AT	2x4'TR
9 H	3x13'UT1	2x9'AT	2x3'TR	2x9'AT	6x2'TR
10 L	20'UT1	2x8'AT	2x2'TR	2x7'AT	3x2'TR
11M	2x12'UT1	2x10'AT	4x2'TR	2x7'AT	2x4'TR
12 H	3x12'UT1	3x7'AT	5x2'TR	2x9'AT	3x3'TR
13 L	**40'UT2**	2x9'AT	2x2'TR	2x8'AT	3x2'TR
14 M	2x16'UT1	3x7'AT	4x2'TR	2x8'AT	2x4'TR
15 H	2x18'UT1	4x6'AT	5x2'TR	2x10'AT	3x3'TR
16 L	50'UT2	2x10'AT	2x3'TR	2x12'AT	2x4'TR
17M	3x12'UT1	3x8'AT	3x3'TR	3x8'AT	3x4'TR
18 H	2x20'UT1	4x1.5'AN	4x3'TR	3x10'AT	4x4'TR
19 L	**50'UT2**	10x1'AN	2x4'TR	2x12'AT	2x3'TR
20 M	3x13'UT1	5x1'AN	3x4'TR	2x15'AT	3x3'TR
21 H	3x14'UT1	8x45s'AN	4x4'TR	3x13'AT	4x3'TR
22 L	50'UT2	6x1.5'AN	4x2'TR	3x8'AT	2x5'TR
23 M	2x16'UT1	6x1'AN	3x3'TR	3x10'AT	3x5'TR
24 H	2x18'UT1	8x45sAN	4x3'TR	3x12'AT	3x6'TR
25 L	2x15UT1	6x1.5'AN	2x5'TR	2x8'AT	4x2'TR
26	25'UT2	1x3'TR	3x1.5'AN	3x45s AN	**RACE**

Notes:

i. The sessions in bold can be replaced by a 2,000m test to measure progress.

ii. Remove the grey column to give four sessions per week.

Table 5.12

The Interactive 2,000,m Training Programme				
Level 2 - Moderately Fit. Informal regular exercise throughout the past 12 months.				
3-4 Sessions Per Week				
WEEK	**1**	**2**	**3**	**4**
1 L	30'UT2	1x18'UT1	2x11'UT1	1x18'UT1
2 M	2x10'UT1	2x12'UT1	13+14'UT1	20'UT1
3 H	2x13'UT1	2x14'UT1	3x10'UT1	2x15'UT1
4 L	40'UT2	2x7'AT	1x18'UT1	1x8'AT
5 M	20'UT1	2x8'AT	2x10'UT1	10'AT
6 H	2x15'UT1	2x7'AT	2x14'UT1	2x8'AT
7 L	**30'UT2**	10'AT	1x18'UT1	10'AT
8 M	2x13'UT1	4x2'TR	25'UT1	2x8'AT
9 H	3X8'AT	2x15'UT1	6x2'TR	30'UT1
10 L	40'UT2	2x2'TR	2x12'UT1	2x8'AT
11 M	4x2'TR	4x20'UT1	2x10'AT	2x14'UT1
12 H	3x8'AT	5x2'TR	2x15UT1	3x3'TR
13 L	**40'UT2**	15'AT	2x12'UT1	3x2'TR
14 M	3x7'AT	20'UT1	2x4'TR	2x12'UT1
15 H	3x10'AT	2x15'UT1	3x3'TR	2x15'UT1
16 L	30'UT2	4x2'TR	2x12'UT1	2x8'AT
17 M	4x2'TR	20'UT1	4x1.5'AN	2x10'AT
18 H	2x15'UT1	3x8'AT	10x1'AN	2x15'UT1
19 L	**40'UT2**	5x1'AN	2x12'UT1	2x8'AT
20 M	20'UT1	2x10'AT	8x45s'AN	3x3'TR
21 H	2x15'UT1	4x4'TR	6x1.5'AN	3x8'AT
22 L	40'UT2	2x10'AT	6x1'AN	2x12'UT2
23 M	6x2' TR	2x15' UT1	8x45sAN	3x7'AT
24 H	30'UT1	6x2'TR	6x1.5'AN	3x8'AT
25 R	30'UT2	2x3'TR	2x12'UT2	2x8'AT
26 R	1x3'TR	2x1.5'AN	3x45s AN	**RACE**

Notes:

i. The sessions in bold can be replaced by a 2,000m test to measure progress.

ii. Remove the grey column to give three sessions per week.

Table 5.13

The Interactive 2,000,m Training Programme			
Level 1 - Sedentary. Not exercised regularly during the past 12 months.			
3 Sessions Per Week			
Week	**1**	**2**	**3**
1 L	10'UT2	12'UT2	15'UT2
2 M	14'UT2	16'UT2	18'UT2
3 H	17'UT2	19'UT2	20'UT2
4 L	10'UT1	25'UT2	30'UT2
5 M	12'UT1	18'UT1	8'AT
6 H	30'UT2	2x10'UT1	2x7'AT
7 L	**15'UT1**	20'UT2	7'AT
8 M	18'UT1	25UT2	9'AT
9 H	4x2'TR	30'UT2	2X12'UT1
10 L	2x2'TR	15'UT1	20'UT2
1 1M	4x2'TR	18'UT1	25'UT2
12 H	6x2'TR	2X12'UT1	30'UT2
13 L	**2x3'TR**	2x10'UT1	2x7'AT
14 M	4x2'TR	16'UT1	25'UT2
15 H	2x4'TR	2x12'UT1	3x7'AT
16 L	6x2'TR	2x8'UT1	20'UT2
17 M	2x9'AT	18'UT1	30'UT2
18 H	2x10'AT	3x2'TR	20'UT1
19 L	**4x1.5'AN**	2x12UT1	2x8'AT
20 M	3x2'TR	25'UT1	2x9'AT
21 H	2x4'TR	30'UT2	2x10'AT
22 L	2x4'TR	15'UT1	2x7'AT
23 M	30'UT2	18'UT1	2x9'AT
24 H	3x2'TR	30'UT2	2x12'UT1
25 T	5x2'TR	6x1.5'AN	3x3'TR
26 T	2x1.5'AN	3x45s AN	**RACE**

Note:

The sessions in bold can be replaced by a 2,000m test to measure progress.

Weight Management

Target Group: Anyone wishing to lose weight or maintain a healthy weight.

Introduction

Many people confuse being overweight with obesity. Being overweight may just mean that you weigh more than the average for your height. Often this can be explained by an unusually heavy bone structure or well-developed musculature.

Obesity on the other hand relates solely to the percentage of body fat deposited about the body. These fat deposits will result in body changes such as a bulging stomach or double chins. Women in particular will display drooping breasts and fat deposits on the thighs and both sexes will be subject to flat feet.

Obesity will increase the risk of disease, in particular respiratory and heart disease. It can also lead to conception and pregnancy problems as well as shorter life expectancy and higher mortality rates. High blood pressure, cirrhosis of the liver and diabetes are more common in obese people. In addition obesity will increase the risk of kidney disease, inflammation of the gall bladder, hernias, arthritis and varicose veins.

Weight Check

There are some simple checks to see whether you are overweight; perhaps the simplest is not to weigh yourself but to look at your profile in a mirror. Without pulling in your stomach check for bulges.

A doctor can calculate your percentage body fat by taking a series of measurements with callipers at different points of the body. Pinching yourself on the upper arm, thigh and midriff and seeing if there is more than 2.5cm is a good guide to being overweight.

As you get older, your body shape and make up will change and relying on the scales alone may not be enough. Use a tape to measure your waist, hips and chest to see if there is any increase. When you do use the scales, always use the same ones and at the same time of day, as your weight will fluctuate naturally.

Weight Reduction

Weight reduction is a health issue and it is therefore wise to consult your doctor before embarking on any drastic eating regime.

Psychologial Eating Disorders

Anorexia Nervosa is a serious eating disorder, which occurs most commonly in adolescent girls and young women. Dieting is taken to such an extreme that the person becomes emaciated and, the dangers to health, created by obesity, are replaced with another equally dangerous range of health risks if not treated.

Bulimia Nervosa is characterised by periods of binge eating followed by vomiting or purging the body through excessive fasting, use of enemas, laxatives, diuretics and compulsive exercising.

Compulsive eating is also a psychological problem where the sufferer becomes addicted to food, which often results from depression, frustration, boredom and loneliness.

If you suffer from any of the above eating disorders then you should seek medical advice.

Methods of Weight Reduction

There are two types of aids that are designed to help reduce weight. Active aids require the user to carry out physical activity, which burns calories. Passive aids claim to reduce weight without the need to exercise but these are of little use. For example muscle contractions caused by external electrical stimulation may improve muscle tone if you are particularly flabby but will not reduce weight. Vibrating belts do not break down fat. Although the user may find them relaxing, they do not burn calories. Reducing garments and saunas can lead to temporary weight loss due to sweating, but this loss will be replaced as soon as you take a drink.

Reducing weight will require an amount of self discipline if you are going to be successful. Going to health farms is expensive and they will only control your diet while you are there. For long term success it is up to you. Even your doctor will be able to do little to help unless the weight problem is as a result of a medical condition. If you do need support then a diet club is the best option but you will still have to do the work.

When deciding on an exercise activity, there are a few things to consider. If you are overweight there is already additional stress on muscle and joints. For this reason it is better to avoid activities that cause impact like running. Also it is better to look at activities that are non-weight bearing and this is why the Indoor Rower is ideal.

Start off gently and remember that initially it is better to finish feeling you could do more than being dead on your feet. Gradually increase the training volume as your fitness level improves and don't expect miracles. It took a long time for the fat to accumulate, it will not disappear overnight.

Anyone, whether they train or not, must balance their energy intake with energy expenditure in order to maintain their bodyweight. This is represented by the energy balance equation:

Energy intake = Energy expenditure (± Stored energy)

In reality this means that in an ideal situation where energy intake and expenditure are equal there is no excess energy stored from food and no use of the body's energy stores. If energy intake is greater than energy expenditure the body stores energy in the form of fat. If energy expenditure is greater than energy intake then the body uses stored energy to top up its requirements. It is this principle that people wishing to lose weight must capitalise on.

For weight management, long periods of low intensity exercise are recommended. However, during exercise, the body will use dietary fat before it uses stored fat, so to make your exercise effective, you will need to reduce the amount of fat in your diet.

A balanced diet is one where you match the energy intake through your diet with the energy output of your lifestyle. Energy is measured in calories and is provided by a combination of carbohydrates (glycogen) and fat. For each gram of glycogen we get just over four calories of energy and for each gram of fat we get nine calories. If you exercise at high intensity, you will burn more calories, but they may not be the ones you want to burn, and just counting calories may not take into account the energy source you are using.

To achieve and maintain your weight goals you need to have realistic expectations and not seek a quick fix. Many people have unrealistic expectations, want swift results and give up if these fail to occur. Here are just a few of the weight loss myths exposed:

- Crash diets do not work. Low calorie diets may result in a quick weight loss, but studies show this is usually temporary and that the body gets accustomed to a low calorie intake and slows down the metabolism. On return to a normal diet the metabolism will not be able to speed up sufficiently to burn off the extra food and will store it as fat.
- Skipping meals makes the body famished and causes overeating. It is better to space calorie intake over the course of a day. To lose weight it is best to eat 25% of calories at breakfast, 50% at lunch and 25% at dinner.
- Hard workouts are not the answer. In order to burn fat, slow down and exercise longer to get the body to use its own fat cells for fuel, rather than the glycogen stores in the muscles.

It is very important when dieting in order to lose weight that a sustainable lifestyle is created. Losing more than 1% body weight per week can be detrimental to health and is often caused by dehydration and not actual loss of body fat. In order to successfully lose weight, there are three areas that you need to pay equal attention to for a successful outcome. Two of these are a reduction in the calorific value of the food you eat and an increase in the calories burned via exercise, while the final element is the mental commitment needed to stick to the regime. All three elements are covered in detail within the Training Guide. The four stage programme illustrated in Table 8.1 increases the exercise duration to a maximum of 90 minutes. It is also worth looking at the weight training programme for rowers in Section 7 which, utilises low weights and high repetitions. It is high in energy costs and would be beneficial to anybody seeking to reduce their weight. Finally, make sure you read Section 9 : Sports Psychology. This contains important information on target setting and enforcing success along with a chart to fill in, laying out your goals. This process helps you to measure your successes and failures, and is highly motivating.

Before you start the programme you should take measurements of your waist, hips, chest, neck, biceps, wrists, thighs and calves. It will then be possible to tell if you are making progress towards your ideal body shape. The reason for doing this and not simply relying on your body weight as an indicator of your progress is that as you progress through your training you will increase your muscle bulk. Muscle weighs significantly more per unit volume than fat as it is denser so your weight may not appear to change, or may even go up, but in fact you are losing body fat, and your body shape will indicate this more clearly than your weight.

Table 8.1

Weight Management Programme			
Session	**Light Week**	**Medium Week**	**Hard Week**
	PHASE 1		
1	10′ UT2 18-20spm	15′ UT2 18-20spm	15′ UT2 18-20spm
2	15′ UT2 18-20spm	20′ UT2 18-20spm	20′ UT2 18-20spm
3	2 x 10′ UT2 18-20spm	2 x 10′ UT2 18-20spm	2 x 15′ UT2 18-20spm
4	15′ UT2 18-20spm	15′ UT2 18-20spm	20′ UT2 18-20spm
5	20′ UT2 18-20spm	20′ UT2 18-20spm	25′ UT2 18-20spm
	PHASE 2		
1	20′ UT2 18-20spm	20′ UT2 18-20spm	2 x 15′ UT2 18-20spm
2	25′ UT2 18-20spm	25′ UT2 18-20spm	30′ UT2 18-20spm
3	2 x 15′ UT2 18-20spm	2 x 20′ UT2 18-20spm	2 x 20′ UT2 18-20spm
4	20′ UT2 18-20spm	30′ UT2 18-20spm	30′ UT2 18-20spm
5	30′ UT2 18-20spm	35′ UT2 18-20spm	40′ UT2 18-20spm
	PHASE 3		
1	30′ UT2 18-20spm	40′ UT2 18-20spm	2 x 25′ UT2 18-20spm
2	40′ UT2 18-20spm	45′ UT2 18-20spm	50′ UT2 118-20spm
3	2 x 20′ UT2 18-20spm	2 x 25′ UT2 18-20spm	2 x 30′ UT2 18-20spm
4	30′ UT2 18-20spm	35′ UT2 18-20spm	40′ UT2 18-20spm
5	40′ UT2 18-20spm	50′ UT2 18-20spm	60′ UT2 18-20spm
	PHASE 4		
1	50′ UT2 18-20spm	60′ UT2 18-20spm	75′ UT2 18-20spm
2	3 x 20′ UT2 18-20spm	3 x 25′ UT2 18-20spm	2 x 30′ UT2 18-20spm
3	40′ UT2 18-20spm	50′ UT2 18-20spm	60′ UT2 18-20spm
4	2 x 25′ UT2 18-20spm	2 x 30′ UT2 18-20spm	2 x 40′ UT2 18-20spm
5	60′ UT2 18-20spm	75′ UT2 18-20spm	90′ UT2 18-20spm

Appendix

The Performance Monitor

Introduction

The Performance Monitor is designed to be menu driven and self-explanatory. We encourage you to spend a little time pushing buttons and following the menus. If you press the wrong button, just use the "MENU BACK" button to return to the previous menu. For additional information select "Information" from the main menu. The following section gives information about the PM3, the basic operation of the PM4 is the same although it has some additional features. PM3 and PM4 menus structures are on pages xi and xii.

Getting Started

- The PM3 turns on when you press the "MENU BACK" button, take a stroke, or insert a LogCard.
- The PM3 turns off automatically after four minutes of inactivity.
- The first time you turn on the PM3, you will be prompted to set the language, date and time. **IMPORTANT:** Setting the date will allow your results to be stored correctly.

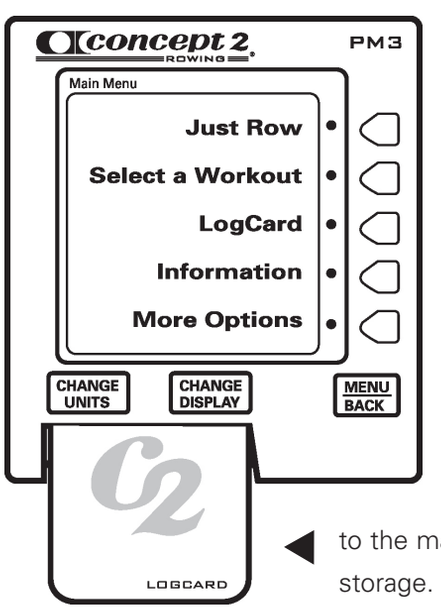
Operation

CHANGE UNITS — Lets you select one of four units for your results: meters (or time), time/500m, watts, and calories. This button is active in rowing displays, result screens, and when setting PaceBoat.

CHANGE DISPLAY — Lets you select one of five rowing displays: All Data > Force Curve > PaceBoat > Bar Chart > Large Print. This button is only active from the rowing displays.

MENU BACK — Returns you to the previous menu. From rowing displays, "MENU/BACK" ends the workout and returns you to the main menu.

▼ Battery compartment under back panel with single screw.



◀ Use these five buttons to make your selections from the menus. From rowing displays, use these as an alternative way to change display.

◀ With a **LogCard**, the PM3 becomes your personal training tool. Insert your LogCard here before setting up a workout and your results will be saved on the LogCard. After your workout, return to the main menu before removing your LogCard to ensure complete data storage. Contact Concept2 for additional LogCards.

Workouts

Pre-Set Workouts

There are three kinds of pre-set workouts in the PM3: Standard List, Custom List and ReRow. If you have a LogCard, you can also access Favorite Workouts.

1. From Main Menu: [Select Workout] > [Standard List] > Select from the standard list of workouts that includes: 2,000m, 5,000m, 10,000m, 30 minutes and an interval workout of 500m/1:00. When you select a workout, it will automatically be set up on the rowing screen. The workout begins when you start to row.
2. From Main Menu: [Select Workout] > [Custom List] > Select from workouts that have previously been set up and stored. The PM3 comes with a list of custom workouts, but if you have a LogCard you can replace them with your own. With your LogCard inserted select [Set Workout] > [New Workout]. When you have finished setting up the workout you will be asked if you wish to save the set-up to your Favorites. Later, you can use [More Options] > [Edit Custom List] > to copy one or more workouts from the LogCard to the PM3 memory.
3. From Main Menu: [Select Workouts] > [ReRow] > then select the type of workout you wish to ReRow. You will then be able to view a list of previous workouts. Select the workout you wish to ReRow. That workout will automatically be set up on the rowing screen and your previous performance will be used to drive the PaceBoat.
4. Favorites: [Select Workout] > [Favorites]

Programming Workouts

The PM3 allows you to program your own specific workouts.

From Main Menu: [Select Workout] > [New Workout] > then select the type of workout: Single Distance, Single Time, Intervals: Distance, Intervals: Time, Intervals: Variable. Enter the information needed to set up the desired workout. When you have finished with the set-up, select "Done". The PM3 will then be ready to start the workout as soon as you start to row.

Intervals: Variable allows you to set a different distance or time for each interval, up to a total of 30 intervals.

Splits

Single piece workouts are split into segments called "splits" for storage and analysis.

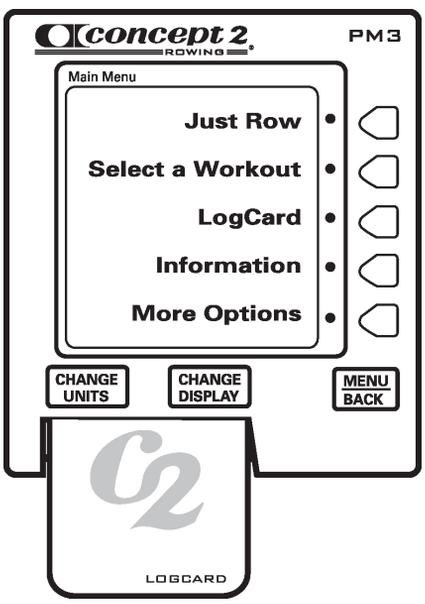
More splits require more storage space on the LogCard. The PM3 will default to five segments or splits per piece. You can change this to a desired split time or distance. Note that a maximum of 30 splits is allowed per workout, and minimum split size is 20 seconds or 100 metres. There are no splits for interval workouts. Note that if you choose to store more splits per workout, your LogCard will store fewer workouts.

NOTE: For any interval workout the first interval starts when you begin to row. All other intervals start as soon as the rest period is finished.

LogCard

The LogCard allows you to:

- Store hundreds of detailed workout results.
- Edit your lifetime metres to include workouts not stored on the LogCard.
- Save your favorite workout settings.
- Race against a previous workout.
- Remember your preferred language, display and units.
- Add up to five users per card.



Your LogCard will automatically be formatted the first time you insert it in the PM3. You will then be instructed to: Add New User - Set your user name using up to six letters.

If you would like to carry forward your previous lifetime metres to this LogCard, use [Main Menu] > [LogCard] > [LogCard Utilities] > [Edit LogCard].

Each LogCard can serve up to five users, but heavy users will probably want to have their own card. The LogCard will hold hundreds of workout results and you will be warned when it is filled.

To add additional users to your card:
[Main Menu] > [LogCard] > [LogCard Utilities] > [Add User]

To delete a user from your card:
[Main Menu] > [LogCard] > [LogCard Utilities] > [Delete User]

To make a correction to your LogCard or User name:
[Main Menu] > [LogCard] > [LogCard Utilities] > [Edit LogCard]

To delete a workout from the LogCard:
[Main Menu] > [LogCard] > [LogCard Utilities] > [Delete Workout]

To copy a workout from LogCard to PM3 Custom Workouts:
[Main Menu] > [LogCard] > [LogCard Utilities] > [Copy Workout]

Your total workout results and the split or interval data are stored automatically in the PM3 Memory and on the LogCard. Also displayed are the average stroke rates and the ending heart rates (if the heart rate option is used). When the PM3 memory is full, the oldest result will be deleted. The LogCard will hold hundreds of workout results and you will be warned when it is full.

If no LogCard is installed

From Main Menu: select [Memory] to view a chronological list of the last workouts that fit into the memory. Use the cursor buttons to select the workout you wish to view. The memory stores data for each split or interval of your workout.

If a LogCard is installed

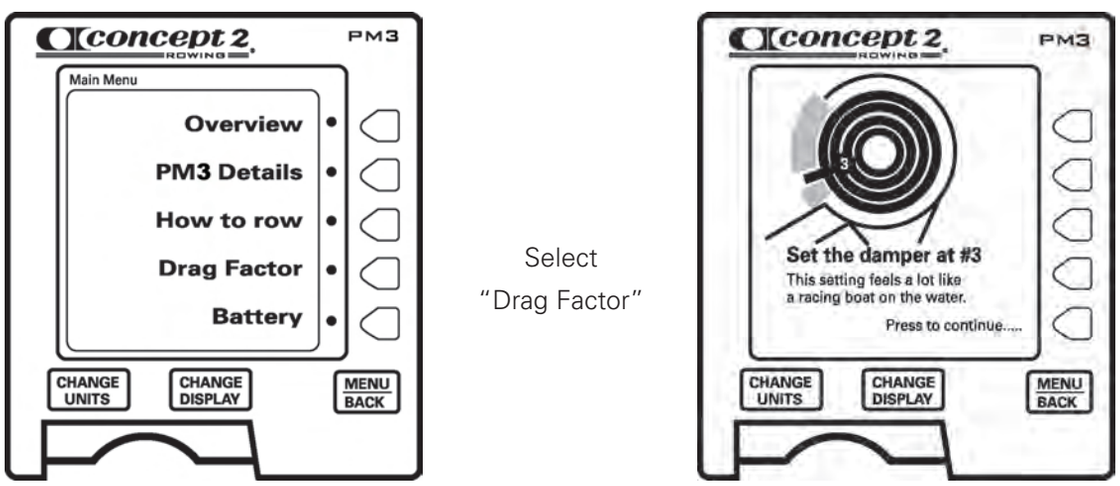
From Main Menu select [LogCard]. Or, from the LogCard User screen, select: [LogCard Menu].

You will then select how you wish to view your log information.

1. A one page summary of your log.
2. A history of your monthly totals.
3. A list of your workouts by date. Use the cursor buttons to select the workout you wish to view in detail. The LogCard stores data for each split or interval of your workout.
4. A list of your workouts by workout type. Use the cursor buttons to select the workout you wish to view in detail.

As with all electronic storage media, we encourage you to make frequent backups of your LogCard data, either by transferring it to a PC or keeping written documentation of key data such as Lifetime Total Metres.

Drag Factor

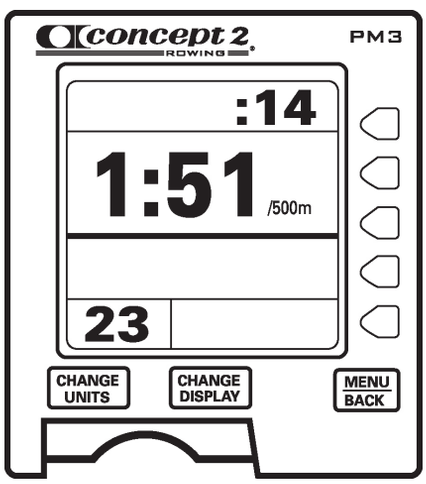


Adjust the Drag Factor by moving the damper lever on the side of the flywheel. This will alter the feel of the stroke. High numbers feel slow and heavy, lower numbers are more like a racing boat. It is best to use a Drag Factor between 100 and 140. This is usually a damper number between 2 and 5. The Drag Factor can be viewed from the More Options menu. Use a Drag Factor that feels most comfortable to you and gives you the best result for the workout.

The damper lever setting required to achieve a certain Drag Factor will vary from one machine to another due to elevation, manufacturing tolerances and accumulated dust inside the flywheel cover.

Display Options

Large Print



Provides basic data in large, easy-to-read format.

Time - How long you've been rowing or still have to row.

Stroke Rate - Measured in strokes per minute (s/m), updated every stroke.

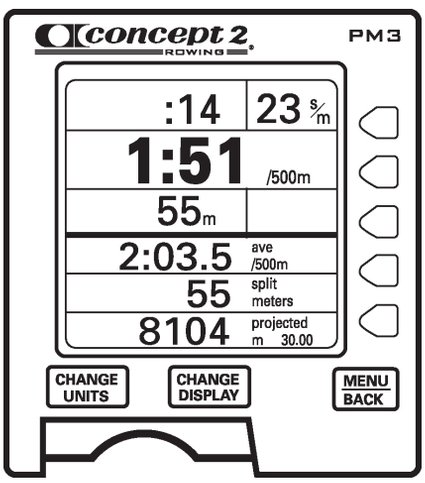
Stroke Output - How hard you pulled on the last stroke. Displayed in a choice of three units: pace/500m, calories/hour and watts.

Total Output - Cumulative output since you started rowing. Displayed in a choice of four units: average pace, metres, calories and average watts.

Heart Rate - If a heart rate interface is attached to the Rower and you are wearing a chestbelt transmitter, this display will show your heart rate in beats per minute.

The same basic data which appears in Large Print also appears in a smaller format in the top half of the screen of the other four displays.

All Data



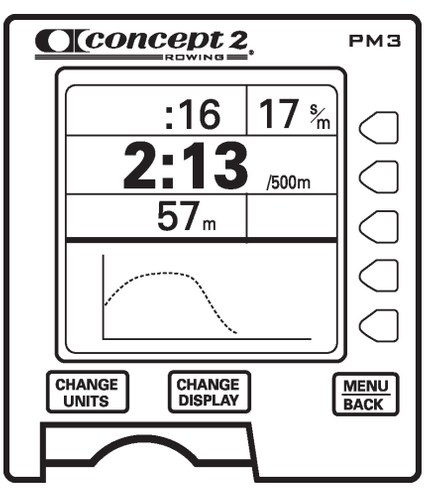
Additional numeric information is displayed.

The top line in the bottom half of the screen shows your accumulated score in time, metres or average time/500m depending on the units you have selected.

During a Just Row, Single Distance or Single Time workout, the middle line shows your accumulating or average result for the current split. During a work interval the current interval number is displayed.

The bottom line is a projected score for your workout if you continue rowing at your current pace. During a Just Row workout your projected metres for a 30 minute row will be displayed. During a rest interval the total workout metres are displayed, including rest metres.

Force Curve



This is a graph of force against time which shows how you apply your force during the drive phase of each stroke.

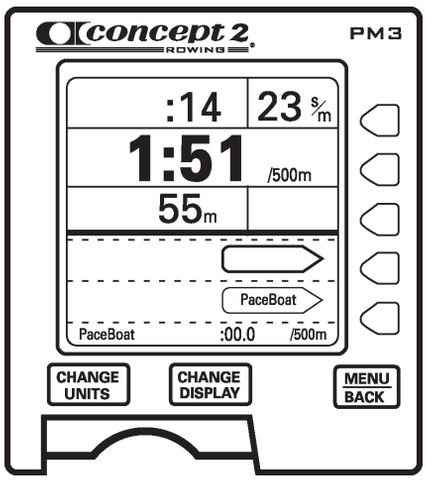
Good technique will be illustrated by a smooth curve which builds to a peak before decaying back to zero at the finish.

Any distortion to the smooth line of the curve can be attributed to a fault in technique.

Some of the most common faults are:

- Driving the legs down too hard, causing the force time curve to rise sharply but then start to decrease before climbing again following the normal path. This type of curve is most commonly seen amongst women and can be attributed to an imbalance between a weak upper body compared to much stronger legs.
- The second most common fault is a step up or plateau just before the finish. This is more common amongst male rowers and is caused by not using the legs properly at the beginning of the drive and then tugging the finish into the body at the end of the stroke.

PaceBoat



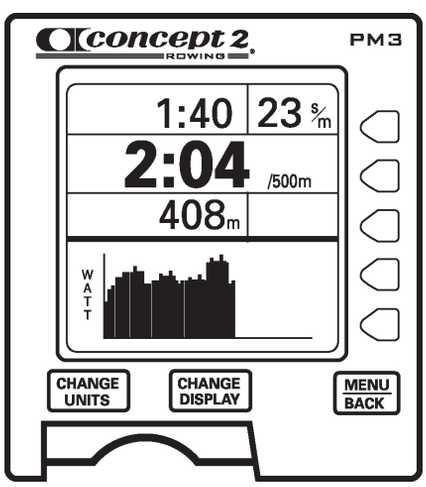
Allows you to row with a virtual competitor.

To set a PaceBoat follow [Set Workout] > [New Workout]

To ReRow against a previous performance follow [Set Workout] > [ReRow]

If no pace is set the PaceBoat will simply mirror your speed. ReRow uses the selected split results for the speed of the Pace Boat.

Bar Chart



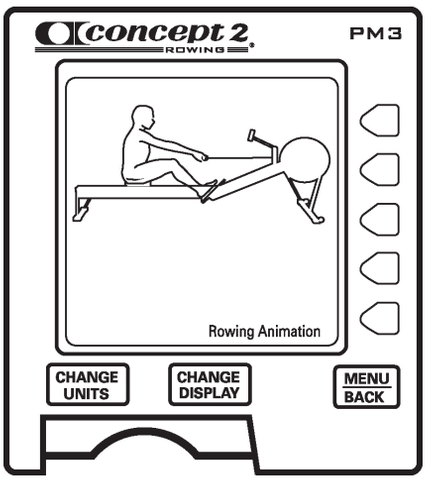
Creates a graphic display of your last 50 strokes.

As you vary the intensity of your workout the range of the display will change to keep your most recent strokes in view.

If a heart rate interface is attached to the rower and you are wearing a chestbelt transmitter, your heart rate will automatically be plotted every 10 seconds instead.

How to Row

The 'Information' section contains instruction on 'How to Row' including basic rowing technique.



Batteries and Power Generation

The PM3 uses two alkaline D-cell or IEC CR20 batteries. It also self-generates if you are using a Model D Indoor Rower or a Model C with retrofit. Depending on the speed of rowing, the PM3 will generate some or all of the power needed for its operation. This will extend the life of your batteries.

- Batteries are needed to maintain date, time, language, Custom List and Memory.
- Batteries can be removed for five minutes without loss of this information, if the PM3 is turned off before the batteries are removed.

When your batteries are low, the following warning will display when you turn on the PM3: "Replace batteries soon."

When your batteries are very low, you will be warned "Batteries too low for normal operation". If you keep the batteries in, and if you have the self-generation feature and start rowing fast enough, you will automatically go into Just Row mode. The display will work, but you will not be able to set up workouts, and your workout data will not be saved.

To change batteries, first allow the PM3 to power down so as not to lose any saved data. Then remove the cover, carefully pry the batteries out and replace within five minutes.

Battery Life Expectancy

- For Model B or C without retrofit: 300-400 hours.
- For Model D, or C with retrofit, normal use: almost the shelf life of the battery.

Care of PM3

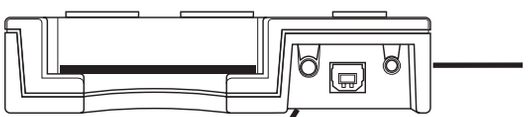
Clean with damp cloth only. Do not apply liquids directly to the PM3.

NOTE:

The following formulas are used to equate the units of measure:

Watts = 2.80/(sec/meter)^3 Cal/hr = Kcal/hr = (watts) x (4) x (0.8604) + 300

Bottom View



Flywheel sensor cable must be connected here for the PM3 to operate. The Model D sensor will also supply power to the PM3 while you are rowing. The PM3 can be set to operate with either the Model D or Model C. They are not interchangable.

Port for the optional heart rate receiver.

USB port for connecting to a personal computer. See www.concept2.com/pm3 for current information on PC functions.

PM3 Menu Structure

- **Just Row** ..... Up to 50,000m without pressing any buttons. Results saved if longer than one minute. Splits default to 5 minutes; after 35 minutes, splits default to 10 minutes; etc. Press MENU BACK when finished to ensure that your results are saved.
- **Select Workout**
  - **Standard List** ..... Includes five pre-set workouts, not changeable.
  - **Custom List** ..... Includes five workouts, can be replaced with workouts from a LogCard. Limit of 30 variable intervals - total.
  - **ReRow** ..... Enables user to select a previous result to drive PaceBoat.
  - **New Workout** ..... Enables user to design a workout in any of the following formats.
    - Single Distance ..... 100m to 50,000m.
    - Single Time ..... 0:20 to 9:59:59; distance cannot exceed 50,000m.
    - Intervals: Distance ..... Constant work from 100m to 9999m; constant rest time from 0 to 9:55; up to 30 intervals.
    - Intervals: Time ..... Constant work from 0:20 to 59:59; constant rest time from 0 to 9:55; up to 30 intervals.
    - Intervals: Variable ..... Combination of distance and time from 100m to 999,999m or 0:20 to 99:59:59; rest time from 0 to 9:55; up to 30 pre-set intervals.
  - **Favourites** ..... Five workouts per LogCard user. Limit of 30 variable intervals total/user.
- **Fish Game**
- **Information** ... Go to this menu for additional PM3 information. This menu selection is an on-board manual. We suggest that you read it.
  - **Overview**
  - **PM3 Details** ..... Describes the PM3 buttons, rowing displays, workouts and LogCard.
  - **How to Row** ..... Gives a brief "rowing lesson" with technique animation.
  - **Drag Factor/Damper** ..... Is a measure of the fan load. The PM3 self calibrates by recalculating the drag factor every stroke so you get a true measure of your effort regardless of the damper setting or changing conditions.
  - **More** .... Includes information on the Fish Game, Racing, Battery and Polar Heart Rate monitoring.
- **More Options** (without LogCard)
  - **Display Drag Factor** ..... Allows the user to view and set the drag factor before rowing.
  - **Utilities**
    - Set Date and Time ..... Is important for result storage.
    - Set Language ..... Sets preferred language. Defaults to preference set on LogCard or last language set on PM3.
    - LCD-contrast. ..... Adjusts the LCD lighter or darker.
    - Battery ..... Shows % battery life remaining.
    - Product ID ..... Shows product identification information.
  - **Memory** ..... Lists 10 most recent workout results by date; oldest are automatically deleted.
- **More Options** (with LogCard)
  - **Display Drag Factor** ..... Allows the user to view and set the drag factor before rowing.
  - **Utilities** ..... Same as without LogCard.
  - **LogCard** ..... Stores about 300 workouts, 5 users, each user's 5 favourite workouts, preferred language, last used unts and display type.
    - Summary ..... Lists users total and average results recorded on LogCard.
    - Monthly Totals ..... Shows a table of monthly workout totals.
    - List By Date. ..... Enables you to look up workout results by date.
    - List By Time ..... Enables you to look up workout results by type.
    - LogCard Utilities ..... Maintain Users, Delete Workout, Move Workout, Edit Custom List
  - **Switch User** ..... Change LogCard user without having to remove the and re-insert the LogCard.

PM4 Menu Structure

- **Just Row .....** Up to 50,000m without pressing any buttons. Results saved if longer than one minute. Splits default to 5 minutes; after 35 minutes, splits default to 10 minutes; etc. Press MENU BACK when finished to ensure that your results are saved.
- **Select Workout**
  - **Standard List .....** Includes five pre-set workouts, not changeable.
  - **Custom List.....** Includes five workouts, can be replaced with workouts from a LogCard. Limit of 30 variable intervals - total.
  - **ReRow .....** Enables user to select a previous result to drive PaceBoat.
  - **New Workout .....** Enables user to design a workout in any of the following formats.
    - Single Distance..... 100m to 50,000m.
    - Single Time..... 0:20 to 9:59:59; distance cannot exceed 50,000m.
    - Intervals: Distance ..... Constant work from 100m to 9999m; constant rest time from 0 to 9:55; up to 30 intervals.
    - Intervals: Time ..... Constant work from 0:20 to 59:59; constant rest time from 0 to 9:55; up to 30 intervals.
    - Intervals: Variable ..... Combination of distance and time from 100m to 999,999m or 0:20 to 99:59:59; rest time from 0 to 9:55; up to 30 pre-set intervals.
  - **Favourites .....** Five workouts per LogCard user. Limit of 30 variable intervals total/user.
- **Games**
  - **Fish Game**
  - **Darts**
  - **Target Training**
  - **Racing**
  - **Biathlon**
- **Information...** Go to this menu for additional PM4 information. This menu selection is an on-board manual. We suggest that you read it.
  - **Overview**
  - **PM4 Details.....** Describes the PM4 buttons, rowing displays, workouts and LogCard.
  - **How to Row.....** Gives a brief "rowing lesson" with technique animation.
  - **Drag Factor/Damper .....** Is a measure of the fan load. The PM4 self calibrates by recalculating the drag factor every stroke so you get a true measure of your effort regardless of the damper setting or changing conditions.
  - **More ....** Includes information on the Games, Racing, Battery and Polar, Suunto & Garmin heart rate monitoring.
- **More Options** (without LogCard)
  - **Display Drag Factor.....** Allows the user to view and set the drag factor before rowing.
  - **Utilities.....** Same as PM3.
  - **Connect HR .....** Allows to user to pair an ANT heart rate transmitter belt with the PM4.
  - **Memory.....** Lists 10 most recent workout results by date; oldest are automatically deleted.
- **More Options** (with LogCard)
  - **Display Drag Factor.....** Allows the user to view and set the drag factor before rowing.
  - **Utilities.....** Same as without LogCard.
  - **Connect HR .....** Allows to user to pair an ANT heart rate transmitter belt with the PM4.
  - **LogCard.....** Stores about 300 workouts, 5 users, each user's 5 favourite workouts, preferred language, last used unts and display type.
    - Summary..... Lists users total and average results recorded on LogCard.
    - Monthly Totals..... Shows a table of monthly workout totals.
    - List By Date. ..... Enables you to look up workout results by date.
    - List By Time..... Enables you to look up workout results by type.
    - LogCard Utilities ..... Maintain Users, Delete Workout, Move Workout, Edit Custom List
  - **Switch User .....** Change LogCard user without having to remove the and re-insert the LogCard.

The Damper Lever and Drag Factor

The load on the Concept2 Indoor Rower is unlike any normal resistance training equipment. There is no pre-set load; what is measured is the ability of the user to accelerate the flywheel overcoming the frictional force of the air opposing the flywheel rotation. The monitor display of the flywheel is a numerical calculation using the acceleration, speed of rotation and moment of inertia.

The damper lever on the side of the fan cage controls the drag factor. With the damper set to level 10 more air can pass across the fan increasing the rate of deceleration (drag). The monitor detects the increase in drag and an adjustment is made to the pace readout.

The monitor displays the drag factor as a number in the order of 100 at level 1 and around 220 at level 10 on a new machine. If the perforations on the fan cage become clogged, then to achieve the same drag factor the damper lever will need to be put on a higher setting. The monitor detects the effect on the flywheel not the position of the damper lever so although the setting on different machines may not be the same, the drag factor reading will always be correct.

Rowers on water use the machine in the range of 125 to 140 or level 3 to 4. The reason for this is that at this level the feel is closest to that of a racing boat therefore making the training rowing specific. Non-rowers using the machine for cross-training or as a sport in it's own right may benefit from a damper setting outside of this range.

It is a question of trial and error to find the most suitable setting for each individual. Once you have found the ideal set up note the drag factor rather that the damper lever setting, as this will remain constant across different machines.

Recommended Drag Factor Settings

Appendix

International rowers train and test with the drag factor setting at a level of resistance that enables them to replicate their rhythm and rate from the water. Good rowing technique is about speed of application of power and not just brute strength.

The table below illustrates the settings recommended by the Amateur Rowing Association and used by Great Britain's international rowing teams for testing and training.

Recommended Drag Factors

User	Drag Factor
J11/12 beginner	95-105 approx
J12/13	105-115
J13/14	110-120
J14/15	115-125
Junior Women	125-135
Junior Men	130-140
Lightweight women performance athletes	125
Heavyweight women performance athletes	130
Lightweight men performance athletes	135
Heavyweight men performance athletes	140

500m Split Time to Watts Conversion

To convert your 500m split time to watts either use the following equation or refer to the table below.

$$\text{Power (Watts)} = \frac{2.8}{(\text{pace})^3}$$

where pace is given as: $$\text{Pace} = \frac{\text{time (seconds)}}{\text{distance (metres)}}$$

Model C 500m Pace/Watts Conversion Table

500m	4:01.0	3:11.3	2:47.1	2:31.8	2:20.9	2:12.6	2:06.0	2:00.5	1:55.9	1:51.9	1:48.4	1:45.3
Watts	25	50	75	100	125	150	175	200	225	250	275	300
500m	1:42.5	1:40.0	1:37.7	1:35.6	1:33.7	1:32.0	1:30.3	1:28.8	1:27.4	1:26.0	1:24.7	1:23.6
Watts	325	350	375	400	425	450	475	500	525	550	575	600

Pace Guide

This pace guide will give you your finishing time for a variety of different workouts, provided you maintain an even pace for the duration of the row.

1,609m = 1 Mile

21,097m = 1/2 Marathon

42,195m = Full Marathon

Pace Guide							
500m	1,609m	2,000m	5,000m	10,000m	21,097m	42,195m	100,000m
1:10	3:45	4:40	11:40	23:20	0:49:14	1:38:27	3:53:20
1:12	3:52	4:48	12:00	24:00	0:50:38	1:41:16	4:00:00
1:14	3:58	4:56	12:20	24:40	0:52:02	1:44:05	4:06:40
1:16	4:05	5:04	12:40	25:20	0:53:27	1:46:54	4:13:20
1:18	4:11	5:12	13:00	26:00	0:54:51	1:49:42	4:20:00
1:20	4:17	5:20	13:20	26:40	0:56:16	1:52:31	4:26:40
1:22	4:24	5:28	13:40	27:20	0:57.40	1:55.20	4:33:20
1:24	4:30	5:36	14:00	28:00	0:59.04	1:58.09	4:40:00
1:26	4:37	5:44	14:20	28.40	1:00.29	2:00.58	4:46:40
1:28	4:43	5:52	14:40	29:20	1:01.53	2:03.46	4:53:20
1:30	4:50	6:00	15:00	30:00	1:03.18	2:06.35	5:00:00
1:32	4:56	6:08	15:20	30:40	1:04.42	2:09.24	5:06:40
1:34	5:02	6:16	15:40	31:20	1:06.06	2:12.13	5:13:20
1:36	5:09	6:24	16:00	32:00	1:07.31	2:15.01	5:20:00
1:38	5:15	6:32	16:20	32:40	1:08.55	2:17.50	5:26:40
1:40	5:22	6:40	16:40	33:20	1:10.20	2:20.39	5:33:20
1:42	5:28	6:48	17:00	34:00	1:11.44	2:23.28	5:40:00
1:44	5:35	6:56	17:20	34:40	1:13.08	2:26.17	5:46:40
1:46	5:41	7:04	17:40	35:20	1:14.33	2:29.05	5:53:20
1:48	5:48	7:12	18:00	36:00	1:15.57	2:31.54	6:00:00
1:50	5:54	7:20	18:20	36:40	1:17.22	2:34.43	6:06:40
1:52	6:00	7:28	18:40	37:20	1:48.46	2:37.32	6:13:20
1:54	6:07	7:36	19:00	38:00	1:20.10	2:40.20	6:20:00
1:56	6:13	7:44	19:20	38:40	1:21.35	2:43.09	6:26:40
1:58	6:20	7:52	19:40	39:20	1:22.59	2:45.58	6:33:20
2:00	6:26	8:00	20:00	40:00	1:24.24	2:48.47	6:40:00
2:02	6:33	8:08	20:20	40:40	1:25.48	2:51.36	6:46:40
2:04	6:39	8:16	20:40	41:20	1:27.12	2:54.24	6:53:20
2:06	6:45	8:24	21:00	42:00	1:28.37	2:57.13	7:00:00
2:08	6:52	8:32	21:20	42:40	1:30.01	3:00.02	7:06:40
2:10	6:58	8:40	21:40	43:20	1:31.25	3:02.51	7:13:20
2:12	7:05	8:48	22:00	44:00	1:32.50	3:05.39	7:20:00
2:14	7:11	8:56	22:20	44:40	1:34.14	3:08.28	7:26:40
2:16	7:18	9:04	22:40	45:20	1:35.39	3:11.17	7:33:20
2:18	7:24	9:12	23:00	46:00	1:37.03	3:14.06	7:40:00
2:20	7:31	9:20	23:20	46:40	1:38.27	3:16.55	7:46:40
2:22	7:37	9:28	23:40	47:20	1:39.52	3:19.43	7:53:20
2:24	7:43	9:36	24:00	48:00	1:41.16	3:22.32	8:00:00
2:26	7:50	9:44	24:20	48:40	1:42.41	3:25.21	8:06:40
2:28	7:56	9:52	24:40	49:20	1:44.05	3:28.10	8:13:20
2:30	8:03	10:00	25:00	50:00	1:45.29	3:30.59	8:20:00
2:32	8:09	10:08	25:20	50:40	1:46.54	3:33.47	8:26:40
2:34	8:16	10:16	25:40	51:20	1:48.18	3:36.36	8:33:20
2.36	8:22	10:24	26:00	52:00	1:49.43	3:39.25	8:40:00
2.38	8:28	10:32	26:20	52:40	1:51.07	3:42.14	8:46:40
2.40	8:35	10:40	26:40	53:20	1:52.31	3:45.02	8:53:20
2.42	8:41	10:48	27:00	54:00	1:53.56	3:47.51	9:00:00
2.44	8:48	10:56	27:20	54:40	1:55.20	3:50.40	9:06:40
2.46	8:54	11:04	27:40	55:20	1:56.45	3:53.29	9:13:20
2.48	9:01	11:12	28:00	56:00	1:58.09	3:56.18	9:20:00
2.50	9:07	11:20	28:20	56:40	1:59.33	3:59.06	9:26:40
2.52	9:13	11:28	28:40	57:20	2:00.58	4:01.55	9:33:20
2.54	9:20	11:36	29:00	58:00	2:02.22	4:04.44	9:40:00
2.56	9:26	11:44	29:20	58:40	2:03.46	4:07.33	9:46:40
2.58	9:33	11:52	29:40	59:20	2:05.11	4:10.21	9:53:20
3.00	9:39	12:00	30:00	60:00	2:06.35	4:13.10	10:00:00

Weight Adjustment Factor (WAF)

When using an Indoor Rower the results that you can achieve are dependent on the power output you can maintain for the distance or time required. Heavyweight rowers are able to maintain a higher level of power output due to their increased weight. In order to enable you to compare your time/distance to someone of a different weight we have included a weight correction formula.

The formula for weight correction is:

$$\left[\frac{weight}{77.27}\right]^{\frac{2}{9}}$$

Using the Weight Adjustment Factor

For timed pieces: Corrected time = actual time x WAF

For distance pieces: $\text{Corrected distance} = \frac{\text{actual distance}}{\text{WAF}}$

Weight Adjustment Factors

Weight (kg)	Factor	Weight (kg)	Factor	Weight (kg)	Factor	Weight (kg)	Factor
50.0	0.908	67.5	0.971	82.5	1.015	97.5	1.053
52.5	0.918	70.0	0.979	85.0	1.022	100.0	1.059
57.5	0.937	72.5	0.987	87.5	1.028	102.5	1.065
60.0	0.946	75.0	0.994	90.0	1.035	105.0	1.071
62.5	0.954	77.5	1.001	92.5	1.041	107.5	1076
65.0	0.963	80.0	1.008	95.0	1.047	110.0	1.082

Training Log

Target/Goal: _____

Name & Address: _____

_____ Postcode: _____

Contact Tel: _____ T-shirt Size: _____ Date of Birth: _____

Email: _____ Page No.: _____

Date	Time				Distance (metres)	Cum. Total (metres)	Comments
	Hrs	Min	Secs	Tens			

Verified by: Print Name: _____ Position: _____

Signature: _____ Date: _____

Concept2 Incentives

Distance Award Scheme

The Distance Award Scheme provides a range of progressive distance incentives appropriate for each age group. When you reach each of your distance goals, send us a copy of the first and last pages of your training log signed by a witness for verification, and we'll send you your well-deserved Distance Award Scheme Certificate and T-shirt. Alternatively you can enter all your times on-line in our On-Line World Ranking (www.concept2.com/sranking03) and just drop us an email when you reach each milestone. There is also a choice of a free Concept2 mug or water bottle for reaching each intermediate million metre mark (every 5 million over 10,000,000m).

There is no time limit within which the distances have to be completed, so you may take as much or as little time as you wish.

Classification

Youth - For anyone aged under eighteen, there are again six Awards:
25,000m, 50,000m, 100,000m, 250,000m, 500,000m and 1,000,000m.

Senior - For anyone aged eighteen and over, the Awards are:
1 million, 5 million, 10 million, 15 million, 20 million metres (and then every 10 million metres).

Distance Award Schemes						
Youth	25,000m	50,000m	100,000m	250,000m	500,000m	1,000,000m
Senior	1,000,000m	5,000,000m	10,000,000m	15,000,000m	20,000,000m	+10,000,000m

Notes

When you reach each of your distance goals, send a copy of the first and last pages of your training log, signed by a verifier, and you will receive a certificate and T-shirt. The metres from each award count towards the next.

Online Incentives

Challenge Series

September 2008 saw the start of this participation-driven league series. The Concept2 Challenge Series is a league, a ranking and a monthly challenge all rolled into one.

Free to enter, there is a different challenge each month between September and May and prizes along the way to incentivise participation as well as reward the top performers. And to keep the momentum of the Challenge Series going over the summer months there are two bonus rounds - these are stand alone rounds - the results do not count towards your season total. To register please go to www.concept2.co.uk/challengeseries

Concept2 League For Schools

The Schools League is similar to the Challenge Series but designed for teams of 4 or 8 rather than individuals and aimed at school pupils. The teams race in a relay format over a different time or distance in 6 rounds each school year. For more information please go to www.concept2.co.uk/league

Logbook & Ranking

Hosted on the American Concept2 website (www.concept2.com/sranking03) the **Personal Log** will allow you to:

- Enter and keep track of all of your workouts online.
- See a list of your personal world ranking entries.
- Access your personal pace chart history, comparing workouts of similar distance or time with each other.
- See weekly and monthly summary statistics as well as total meters and time.
- Export your log to a text file.
- See average daily meters since your first piece of the season.

The **World Ranking** is where rowers and skiers all over the world:

- See how they stack up next to their competition.
- Submit their own results to the ranking.
- Get motivated by terrific competition.

When the ranking was first put online in 2000, we didn't anticipate how popular it would be! Many years and some hundreds of thousands of entries later, the Online Ranking and Logbook have become the most interactive motivators that we know of for users around the globe. Have fun!

Indoor Races

Indoor races come in all shapes and sizes. National and World Championships are staged annually over the 2,000m race distance. However, many other events choose different race formats. For an up-to-date race calendar check out the Concept2 website (www.concept2.co.uk/racing/calendar).

Table 10.6

Events Organised by Concept2	
British Indoor Rowing Championship (2,000m)	UK, usually in November (concept2.co.uk/birc)
World Indoor Rowing Championship (2,000m)	Boston USA, each February (crash-b.org)
European races	National and regional races throughout Europe, October to April

concept 2

ROWING

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