



Product Manual 2006

the Original rowing simulator

www.rowperfect.com.au

CONGRATULATIONS! AND WELCOME TO THE ROWPERFECT FAMILY

You have just made a critical decision that could greatly benefit your training, preparation and rowing performance. Many Olympic, World and National champions have made this decision before you and have benefited from Rowperfect's unique ability to harness and perfect their talents. Whether you are striving for personal gains in fitness, strength, endurance, superior personal performance or indeed an Olympic gold medal Rowperfect can help you optimise your approach *and* your results.

"Good rowing gives immense satisfaction."

A handwritten signature in black ink, appearing to read 'H. H. H.', is written over a long, horizontal, slightly wavy line.

THE ROWPERFECT ROWING SIMULATOR

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THE ROWPERFECT ROWING SIMULATOR

1. INTRODUCTION

The ROWPERFECT rowing simulator is the first rowing machine whose design philosophy is to truly simulate the dynamics of a light racing shell, floating on water. The main frame and seat are designed to simulate the boat, and the main bar simulates the water.

In the Rowperfect's patented design**, the flywheel assembly weighs around 19 kgs, a weight deliberately selected as it is almost exactly the middle of the range of the **weight per rower** of most racing shells (Including oars and attached water). The seat is labile, as is the case in a boat, forcing the rower to sit - and row - symmetrically.

In addition, the flywheel has been specifically designed, in both weight and resistance characteristics, to match the weight (inertia) and resistance of a boat.

By designing the flywheel so carefully, ROWPERFECT'S designer Casper Rekers was able to satisfy the critical requirement for realistic simulation: On average during the stroke, the kinetic energy stored in the flywheel must equal the kinetic energy which would occur in a moving boat. Additionally, by choosing the correct-sized resistance disk it is possible to vary the resistance and thereby mimic different classes of boat and different gearing ratios - equivalent to varying the ratio between the inboard and outboard of the oar.

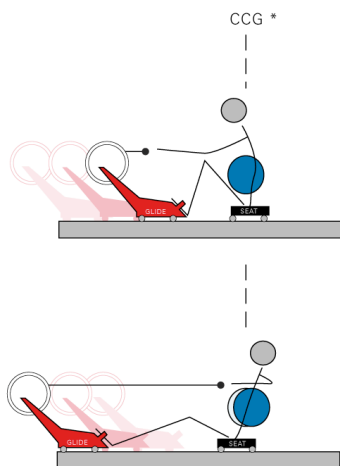
These changes may seem quite revolutionary, and you may wonder why they have been made, and why they are so important. Exactly what are the benefits of the sliding carriage, the Rowperfect flywheel, and a labile seat?

Firstly, increased safety for the user. The **Limited Tilt Seat** forces the rower to sit symmetrically, which helps to equalise the loading on each side of the spine. The **19 kg sliding carriage** reduces the inertial forces acting on the rower at the beginning ("catch") and end ("finish") of the stroke because **the rower's body speed is six times slower than on a fixed rowing machine**. The result is a smoother action, with much less energy to be absorbed by the rower's tendons, ligaments and cartilage at those turning points.

"When changing direction at each end of the stroke, the energy involved (kinetic energy) has to reduce to zero. This energy is about 6 times higher with the fly wheel fixed compared to floating, which means the distance required to reverse direction at each end of the stroke will be further. The analogy is that the braking distance for a heavier car will be further than that for a lighter car using the same braking force.... the longer stroke length with the flywheel fixed is a risk factor for injury to the body structures absorbing kinetic energy" Dr I.Berstein, Mr.O.Webber, Prof. R. Woledge, Institute of Human Performance, University College, London.

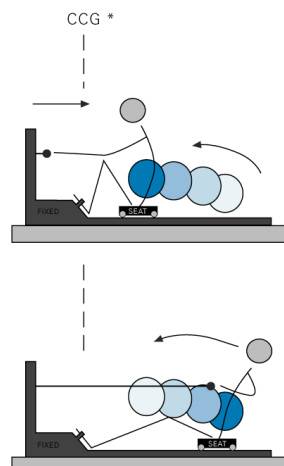
Differences between Rowperfect or on-water rowing and ergometer

Rowperfect rowing or On-water



- Rower moves a lighter mass (17-23kg) relative to himself
- Boat or RP moves far more than the rower, whilst the head & torso of the rower remain almost still
- Labile seat optimises balance and promotes equal loading of the spinal column

Fixed rowing machine (ergometer)



- Rower moves his body relative to an immovable support
- Body acceleration at the catch & finish are approximately six times greater than in the boat or RP
- Head oscillates up to 2 metres per stroke

* COMMON CENTRE OF GRAVITY

Although the Rowperfect does simulate a racing boat very closely, there are important differences:

- Because oar handling technique is not required, deterioration of that technique due to fatigue will not serve as an automatic safeguard for the oarsman against over-exertion, as would happen in a boat.
- Because the oarsman does not have to push the oar away at the beginning of the recovery, but instead is partially pulled back by the elastic shock cord, there is a tendency to row at a slightly higher stroke rate than in the boat.
- And lastly: unlike the water, the main bar is not of infinite length. Therefore, to stabilise the position of the rower within this finite length, there is a slight downward bend in the main bar, with its lowest point at approx. 40 centimeters from the hind leg. [Before use the unit should be properly leveled as per section 4. a. "Levelling the unit" of this manual](#)

**** Patents:** U.S.Patent 5,382,210

European Patent 0 376 403 B1

2. SAFETY

WARNING - The Rowing simulator comprises moving parts.

In general these parts are shielded and shrouded to mitigate the potential for injury due to deliberate or inadvertent mishandling.

Never remove any of the protective covers or screens.

Never introduce any part of the body into or under the moving mechanisms of the simulator.

Replace or repair any damaged shielding components.

Ensure the simulator is stored in a location where infants or children cannot gain access and inadvertently set the simulator moving mechanisms into motion.

Do not use the simulator when children or infants are present.

Physical

- Ensure that it is not dangerous for you to undertake a strenuous exercise.
(Consult your physician!)
- Always warm up properly. For example rowing easily for 5 to 10 minutes at a pulse frequency of 120 to 130 strokes per minute.
- Although the unit easily permits it, do not row at a higher stroke rate than you would be capable of rowing in a boat.

Mechanical

- Properly install the rowing simulator with the main bar at the correct inclination. Adjust the inclination when front or hind leg is being touched by the main frame or the seat, by raising slightly the side that is being touched.
(see Diagram Section 4a. - Leveling the Unit)
- The ROWPERFECT machine has not been designed for use in the vicinity of children.
Keep children away when exercising.
- Allow for 1 m of clear space around the machine when in use.
- Keep spectators at more than an arms length from the rotating flywheel and the moving main frame.
- Never touch the rotating flywheel, and do not touch the main frame when in use.
- Always pull the handle with two hands, and do not bend, twist or kink the chain. Any abuse of the chain may result in injury.
- Always place the handle into the handle hooks or against the cage before letting go. Never let the handle fly into the cage.
- Avoid ties, shawls or other clothing from being sucked into the cage by the rotating flywheel.
- Prevent objects from falling or being thrown into the rotating fan.
- Wear tight clothing and keep clothing free from the seat rollers.
- Maintain your machine properly as recommended (see Maintenance)
Replace worn or defective parts before using the unit.

In general: Treat your ROWPERFECT rowing simulator with the same loving care as you would treat the real racing boats it so closely simulates.

3. ASSEMBLY

ASSEMBLY OF THE BASE UNIT

The ROWPERFECT rowing simulator comes pre-assembled into **8** separate parts:

- | | |
|------------------------|------------------|
| 1. Flywheel | 5. Main bar |
| 2. Cage | 6. Seat |
| 3. Main frame assembly | 7. Legs |
| 4. Handle | 8. Footstretcher |

Ancillary options:

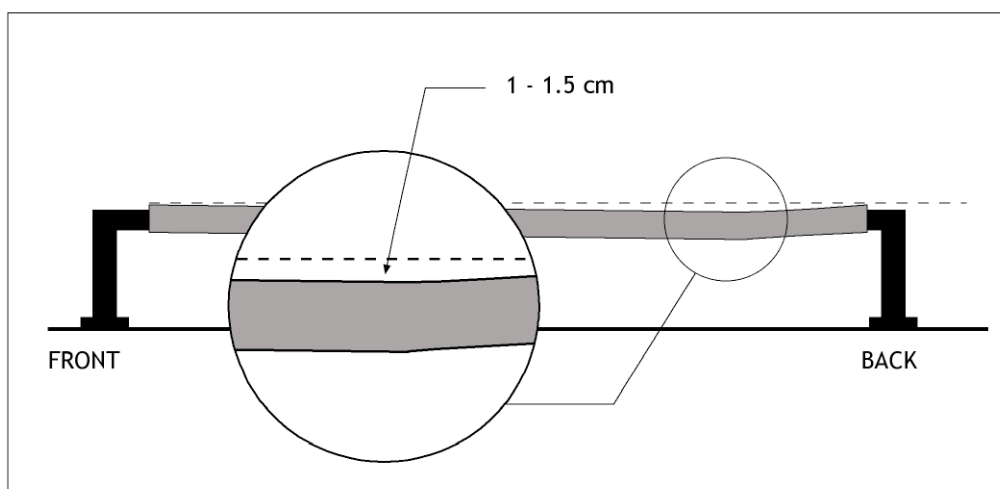
- Computer interface and brackets, serial communications lead, and diskette.
- Heart rate interface

Tools needed:

- | | |
|------------------------------------|--------------------------------|
| 1 clothes peg (spring loaded type) | 1 socket size 17 for M10 nuts |
| 1 spanner size 8 for M5 nuts | 1 spanner size 19 for M12 nuts |
| 2 spanners size 10 for M6 nuts | |

Prior to assembly please note:

The main bar has one straight and one upward curved end. This upward curved end is the back end. Similarly, one of the legs has its upper part at a 90 degree angle (front leg); the upper part of the hind leg has a downward inclination.



note: existing bend in rear end of the bar.

Lay the main bar on the floor with the curved back end of the main bar pointing upwards.

Push the hind leg into the back end of the main bar, with its vertical bar perpendicular to the central section of the main bar. Insert one 6 mm bolt from top to bottom, place an M6 Nyloc nut and tighten.

At this point it is essential that the main bar is meticulously cleaned. Use a clean cloth with a little light oil. Throughout the life of your Rowperfect make sure to regularly clean the main bar in this way as detailed in Section 5 Maintenance.

Slide the seat onto the main bar with the double curved side of the seat pointing towards the hind leg.



Now slide the main frame assembly onto the main bar with the shaft side pointing away from the seat.

Insert the front leg, 6 mm bolt and M6 Nyloc nut, and tighten.



The stretcher boards have two straps, both of them provided with a buckle.

The stretcher boards should be attached to the stretcher bars in such a way that the buckles point away from the main frame.

Put the two stretcher bars through the corresponding holes in the main frame and put the stretcher bolts through the corresponding holes in the stretcher bars.

Remove the cover from the flywheel cage by removing the 4 domed cap M5 nuts with an 8mm spanner.

Remove the flywheel from the cage and put it aside for later use.

Unscrew the two M6x16 bolts next to the main shaft on the right side of the main frame assembly.

Take the flywheel cage and align the four 6 mm holes with the four 6 mm holes in the main frame assembly.

Provide the two M6x16 mm bolts each with a drop of silicon sealant and put them into their original position, do not yet tighten.



2 'boomerang' metal plates are included with the machine - **serving as a** chain guide attached to the flywheel cage.

The plates are set on either side of the main housing, with the tip of the 'boomerang' following the curve of the cage, ie away from the seat. One plate fits in between the flywheel cage and the main housing, being bolted by the 2 longer bolts that pass through the large washers welded inside the cage and single plate on the outside of the cage. The bolts then fit into the corresponding holes on the main housing. [Show photo from the other side in stead of this one.](#)

Insert one of the boomerang plates between the cage and the main housing, and align the holes. Next provide the two M6x20 bolts also with a drop of silicon and insert them into the other two mounting positions of the cage through the holes in the boomerang and into the main housing. Position the cage symmetrically around the main shaft, and tighten all four bolts. Check that the main shaft does not touch the central ring of the cage.



Pull the chain out approx. 60 centimetres. Put a clothes peg onto the chain close to the main bearing block to prevent it from recoiling. Take the 6 mm U-bolt and put it through the slot in the chain-handle connector.

Put the U-bolt through the handle; place a 6 mm washer on both ends, each followed by a M6 Nyloc nut. Tighten the nuts until the bolt ends are flush with the rim of the nuts. Do not over-tighten.

Place the handle behind the handle hook and remove the clothes peg. On the opposite side of the housing the remaining plate is bolted to its 2 corresponding holes. The spacer bolt with black metal roller is then fitted between the top of the 2 plates, completing the guide.



Take the flywheel and remove the plastic dust protection cap from the hub.

Carefully align the flywheel hub with the main shaft, and gently slide the flywheel onto the shaft.

Place the M10 Nyloc nut onto the shaft and tighten with the size 17 socket, securing the shaft with the size 19 spanner on the opposite side.



After tightening the tension on the main shaft due to this M10 nut subsequently has to be released. To release this tension, hold the flywheel by the vanes to keep it from rotating, and un-tighten the M10 nut by turning it counterclockwise over approximately 5 degrees (about 1/10th of the distance between two subsequent vanes).

Replace the cover and place the domed cap M5 nuts.

To facilitate positioning and tightening of the domed cap nuts the rim of the cage should be slightly pushed outward during this operation.

After tightening, the nuts are thus secured by the outer wire of the cover of the cage. Do not over-tighten!

The clearance between the main bar and the rollers of the main frame has been adjusted in the factory.

However, prior to using the unit, please check the clearance as per Section 5. Maintenance and adjust if necessary.

PHOTO OF ASSEMBLED MACHINE HERE

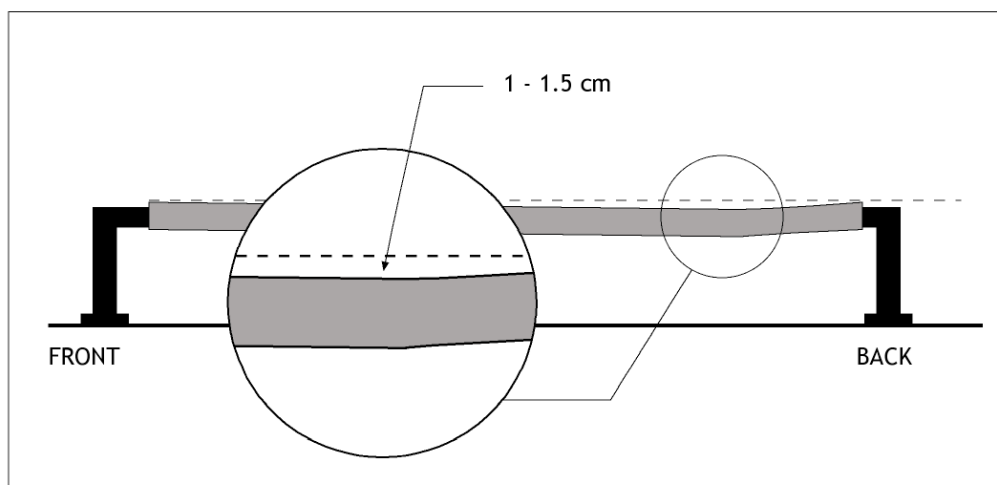
4. ACTIONS PRIOR TO ROWING:

(A) LEVELLING THE UNIT

Before starting to row, the unit should be leveled correctly, in order to allow gravity to stabilize the position of the rower at the correct place. The unit should be levelled in such a way that when rowing, neither of the two support legs is touched by the main frame or the seat. For leveling the unit, the height of the front leg is adjustable by means of a M12 bolt, spanner size 19. Turning the adjustment bolt clockwise shortens the front leg, and thus lowers the front, turning it anti-clockwise raises the front end.

To level the unit correctly, proceed as follows:

Put the unit where it is going to be used. Sit down on the seat and place your feet on the stretcher. **Without using the handle**, sit in the catch position, and push to and fro with the legs quickly over a distance of approx 10 cm a couple of times. Gravity then causes you to arrive at the lowest point of the bar. Properly leveled, the position of the **front** of the seat is then at approx. 40 cm from the rear of the main bar.



Your ROWPERFECT base unit now is ready for use.

If while rowing, the main frame still touches the front leg repeatedly, raise the front by turning the adjustment bolt anti-clockwise. If on the other hand the seat repeatedly touches the rear leg, lower the front leg by turning the adjustment bolt clockwise.

(B) ADJUSTING THE BOAT SIMULATING CHARACTERISTICS

How a racing shell "feels" is derived from three factors:

- A mixture of inertial forces and friction forces during the stroke and recovery;
- The type of oar used;
- The inboard/outboard ratio of that oar

The flywheel assembly of the ROWPERFECT rowing simulator weighs 19 kgs, which is close to the average weight per person of most racing shells (including the oars and the boundary layer of water attached to the boat's surface).

To adjust the level of friction, the central part of the fan is covered by disks of different size. Four different disks come with the machine.

With the combination of these disks and the two sprockets generally the ROWPERFECT can be made to give the same "feel" as a boat. Choose the combination that simulates your boat closest. If required, bigger or smaller disks can be cut by the user from similar material to fine tune. Always use full disks for adjustment of the level of friction, do not use louvres to throttle the fan at the inlet, as this will change the friction characteristics of the fan. This then will lead to erroneous readings for power and all related parameters.

5. MAINTENANCE AND ADJUSTMENT

GENERAL:

To get the best performance from your ROWPERFECT rowing simulator, treat it with the same loving care as you would treat the real rowing boats it so closely simulates.

The actual level of maintenance required will vary depending upon the type and frequency of use, and where the machine is used.

How to keep your ROWPERFECT in good shape:

MAIN BAR AND SLIDING FLYWHEEL ASSEMBLY:

To really simulate the dynamics of a racing shell, freely floating on the water, it is essential that the flywheel assembly slides over the main bar with zero clearance between rollers and main bar, and with very low resistance. Build-up of any dirt on the surface of the main bar will not only increase the resistance and reduce the simulation of real rowing, but will also induce extremely high compressive strains in the main bar when the rollers are forced over it when rowing.

These compressive strains will eventually cause failure of the main bar due to fatigue cracks on its corners.

The following maintenance schedule can serve as a general guideline for main frame and main bar:

Before or after each training session:

Wipe the main bar clean with an oil-soaked cloth to remove dust and sweat and to lubricate the contact between rollers and main bar.

Oil: Standard SAE 20 W or 20 W 40 motor oil or a paraffin-based lubricant such as INOX.

***** NEVER USE WD-40 OR OTHER KEROSENE-BASED PRODUCTS - THESE WILL DAMAGE THE PRE-PACKED BEARINGS BY DISSOLVING GREASE.**

WEEKLY OR EVERY 50 HRS OF USE, WHICHEVER IS THE LONGEST:

Check the clearance between the rollers of the flywheel assembly and the main bar. The clearance of the top rollers on the stretcher side, and the bottom rollers on the flywheel side should be such that one is not able to make the roller slip over the surface of the main bar, by retaining the roller by pressing a thumb firmly to the surface of the roller, and moving the flywheel assembly to and fro over the main bar. If a particular roller can be made to slip, adjustment of the clearance of that roller is necessary.

ADJUSTING THE ROWPERFECT

****NOTE****

- a.) Before commencing, ensure the main bar and all bearings are meticulously clean. If not, carefully slide the main mechanism off the bar and clean bar and bearings before proceeding.
- b.) The aim of adjustment is neutral force but definite contact at each bearing to ensure equal loading of all 8 main bearings without compression

ADJUSTMENT STEPS

1. Totally loosen all M8 locking nuts (13mm spanner)
2. Loosen all 13mm locking nuts approximately 180° /half turn, or as needed until one of the large bearings at each contact point is NOT in contact with the main bar. The mechanism will now float up and down the bar very easily too easily in fact. **DO NOT ROW THE MACHINE WHEN THE BEARINGS ARE LOOSE LIKE THIS** - force is distributed unevenly and the bar can be damaged.
3. Begin adjusting the bearings in pairs - we recommend starting with the pair furthest from the foot blocks - in the following manner:
 - initially tighten the 13mm Nyloc nut on each side until all four bearings are in contact with the bar, and only 1-2° past the point where the bearings can be trapped (prevented from turning) by the application of firm finger pressure
 - now tighten the 13mm locking nut downwards to a reasonably strong torque, but without excessive force
 - If one of the bearings loses contact or is very easily "trapped", then by a combination of loosening the locking nut and tightening the Nyloc nut by small amounts (less than 1/8th turn) proceed until all four bearings are correctly tensioned.
4. Repeat the process with the bearings closest to the foot blocks. **NOTE:** The bearings below the bar at this point are not accessible for finger trapping - however in a brightly lit room and with a little practice you can look down between the bar and cover plate, and see whether the bearing is rotating or not.
5. Go back and check all four points in case minor adjustments in tension have occurred when distant bearings were tensioned. Make small adjustments if needed.
6. With regular maintenance including cleaning after use, the Rowperfect bar and bearings will last for many hours. **INADEQUATE MAINTENANCE WILL GREATLY REDUCE THE WORKING LIFE OF THESE WORKING PARTS** - so please treat your Rowperfect like you would treat a racing boat - it will repay your efforts many times over.

EVERY 200 HRS OF USE OR EVERY 4 WEEKS, WHICHEVER IS THE LONGEST:

Check that the following bolts and nuts are not loose:

- The four M6 bolts holding the main bearing block to the main frame.
- The two additional M6 bolts holding the cage to the main frame.
- The four capped M5 nuts holding the cage cover to the cage
- The four M6 bolts and nuts that hold the stretcher boards.
- The bolts and nuts holding the front and hind leg to the main bar.

CHAIN.

To get the longest life from your chain and sprockets, keep the chain clean and properly lubricated at all times.

Do not use too much lubricant for the chain, as this may reduce the life of the elastic cord.

THE FOLLOWING SCHEDULE CAN SERVE AS A GUIDELINE FOR CHAIN MAINTENANCE:

WEEKLY OR EVERY 50 HRS OF USE, WHICHEVER IS THE LONGEST:

Soak a clean rag or paper towel with approximately 5 ml of SAE 20 or 20 W 40 motor oil. Pull the chain gently all the way out, until it stops.

Wipe the oil soaked rag or paper towel along the full length of the chain repeatedly, to lubricate the chain and at the same time remove accumulated dirt and lubricant residue. Finally wipe the chain clean of any excess oil with a clean dry rag or dry paper towel.

EVERY 200 HRS OF USE OR EVERY 4 WEEKS, WHICHEVER IS THE LONGEST:

Inspect the chain handle connection. Check the connector piece and the U-bolt that connect the chain to the handle. The connector piece is attached to the chain in the factory. When new, the hole in the connector piece is elongated, and the width of the rim of the connector piece pointing towards the rower is 5.5 millimeters. The chain and the connector piece should be replaced if the remaining width of the rim of the connector piece has become less than 3 mm. The U-bolt should be replaced if it is nearly half worn.

Inspect the chain for stiff links. Stiff links can cause the chain to skip over the sprocket. This can lead to injury and causes excessive wear of both chain and sprockets. Stiff links can be caused by lack of lubrication, build-up of dirt, or mechanical abuse of the chain. Generally repeated cleaning and lubrication, as in weekly maintenance, will loosen up the links. If this is not the case and the chain skips over the sprocket, the unit should not be used. Contact your ROWPERFECT agent for a replacement chain and sprockets.

6. PARTS LIST

The ROWPERFECT rowing simulator consists of the following sub- assemblies:

1. Main frame upper part
2. Main frame bottom part
3. Flywheel cage
4. Flywheel
5. Seat
6. Main bar
7. Support legs

A full parts list can be downloaded of the Rowperfect website

WARRANTY - Your CARE ROWPERFECT rowing simulator is warranted against all defects in materials and workmanship for a period of one year after shipment.

Normal wear and tear, and damage due to poor maintenance, are excluded from this warranty.

If parts are found defective, contact your nearest ROWPERFECT agent, or our office directly 61-2-99399777 or info@rowperfect.com

To be considered for warranty replacement or repair, the defective parts must be returned, postage paid, to your Rowperfect agent together with a description of how the piece failed. The customer is responsible for all shipping costs.

The foregoing obligation is Rowperfect BV's sole liability under this warranty, express or implied, and excludes any liability for consequential damages.

Trouble shooting - Interface

Rowperfect simulator	Problem	Cause	Solution
	Wheel wobbles	Bent Wheel - wobbles all the time	Wheel usually can be straightened - contact info@rowperfect.com.au and arrange transport
		Bent Shaft - wobble occurs when chain recoils	Shaft must be realigned. Contact your rowperfect agent
	'Banging' as flywheel rotates	Loose bolt on protective cage (rare)	Remove flywheel (carefully!) and tighten bolt, then replace flywheel
		Interface is too close; micromagnets are hitting sensor as wheel spins	Re-adjust sensor position - allow 2-3mm clearance
	Slow chain return	Elastic rope stretched / deteriorated Bearings in main block are too tight or shaft is too large	Replace. NB leaving the handle at the cage between workouts will greatly extend rope life Contact info@rowperfect.com.au for detailed explanation if you have dropped machine or other misadventure suspect the bearings in the main block need replacing. Maybe try little INOX spray or similar
	Carriage sliding too freely / not freely enough	Incorrect adjustment Requires cleaning and / or oiling	Ref "Adjusting your Rowperfect" in Maintenance section INOX spray / light machine oil + rag + elbow grease!
	Bearings have developed a light coating of rust	Insufficient maintenance / excessive exposure / not enough use!	Often, simply spraying with INOX, then rowing 10mins, then cleaning with a rag will suffice. Maybe repeat. If still present obtain 800 or 1000 grade sandpaper, remove main arm / seat; spray and gently rub. Usually adequate. If hopeless, replace bearings - contact info@rowperfect.com.au to order (\$6 - \$9/bearing depending on size, plus P&H)

Trouble shooting - Interface

	Problem	Cause	Solution
Interface	Difficulty booting/accessing DOS	Trying to launch via later versions of Windows	<p>Follow these steps:</p> <ol style="list-style-type: none"> 1. Turn off computer 2. Insert diskette into a: drive 3. Turn on computer <p>If no luck, either diskette is corrupted or computer A: drive problem.</p> <p>If Windows XP or 2000 - either re-configure BIOS (in Section 4 of Rowperfect interface manual)</p> <p>Rowperfect for Windows software - contact your Rowperfect agent</p>
	Interface not found	Incomplete circuit - connection to computer or interface or broken wire in cable	<ol style="list-style-type: none"> 1. Check connections - blow into sockets at both ends in case dust is causing contact failure 2. Check wires, especially in com port connector - NB if broken, it is likely someone has been pulling plug out using the cable and not holding the plug for leverage.
	Interface found, but error in force curve or force curve scattered randomly	Pickup not aligned correctly	<p>Adjust alignment - often only by 1-2mm. Ensure micromagnets are passing through the centre of the sensor.</p> <p>(Refer to Rowperfect video or Section Rowperfect Interface in this manual.)</p>

8. DISTRIBUTORS

For more information on ROWPERFECT write or call to any of the following addresses:

AUSTRALIA

ROWPERFECT Australia
Mark and Gill Campbell
4 Moore Road,
Harbord NSW 2096
Australia
Tel: +(61) 2 993 99777
Fax: +(61) 2 993 99777
E-mail: info@rowperfect.com.au

NEW ZEALAND / SOUTH EAST ASIA

ROWPERFECT Australasia
Peter Mills
14 Croydon Road,
Mount Eden
Auckland
Tel: +(64) 9 623 1095
Fax: +(64) 2 9 302 2437
E-mail: sculler@xtra.co.nz

CANADA

Bob Stubbs
RR1, S50, C-17,
Osoyoos, B.C. V0H 1V0,
Canada
Tel: (250) 495 4446
Fax: (250) 495 5304
E-mail: stubbies@direct.ca

CZECH REPUBLIC

Michal Vabrousek
Sosnovecka 580/6
Praha 8,
Czech Republic
Mobile: +(420) 603 478 496
E-mail: michal@vabrousek

IRELAND

Rowperfect Ireland
Gerry Farrell
70 Whitworth Road
Dublin 9,
Republic of Ireland
Tel: +353 1 830 4600
Mobile: +353 87 240 2721
E-mail: rowperfectireland@yahoo.co.uk

JAPAN

StrokeOar Japan Corp
Tetsuji Kuramoto
2161-19 Oishi, Kawaguchiko-Cho,
Minamitsuru-Gun, Yamanashi Pref.,
401-03 Japan
Tel: +(81) 555-76-8562
Fax: +(81) 555-76-8560
E-mail: kura@strokeoar.co.jp
www.strokeoar.co.jp

NEDERLAND/THE NETHERLANDS

Heeres Boatservice,
Rob Heeres
Verlengde Hoogravenseweg 13,
3525 BB Utrecht
Tel/fax: 030 280 5068
Mobile: 06 533 540 07
E-mail: info@heeresboatservice.nl
www.heeresboatservice.nl

JOROW
Jorg Santen
Valkenkamp 758,
3607 MX Maarssen.
Tel: 0346 679 233
Fax: 06 557 122 89
E-mail: jorose@zonnet.nl

ÖSTERREICH

Fritz Kutmon,
Fröhlerweg 7,
4040 Linz.

Österreich

Tel/fax : +43 732 757 354
Mobile: +43 664 336 2102
E-mail: f.kutmon@magnet.at
E-mail: staempfli.ag@datacomm.ch

SCHWEIZ / SUISSE / SVIZZERA

Stämpfli Racing Boats AG
Melchior Bürgin
Seestrasse 497,
8038 Zürich,
Schweiz
Tel: +(41) 1 482 99 44
Fax: +(41) 1 482 05 03

UNITED KINGDOM

ROWPERFECT UK
Grant Craies and Rebecca Caroe
7 Vicarage Close, Waterbeach,
Cambridge CB5 9QG
E-mail: info@rowperfect.co.uk
E-mail: grant@rowperfect.co.uk

UNITED KINGDOM

USA

Durham Boat Company, Inc.
Coleen Fuerst and Jim Dreher

220 Newmarket Rd.,
Durham, NH 03824,
Tel: (603) 659 7575
Fax: (603) 659 2548
E-mail: cfuerst@cris.com
www.durhamboat.com

0205 Subject to change without notice.

THE ROWPERFECT COMPUTER INTERFACE (OPTIONAL)

1. PLACING THE INTERFACE

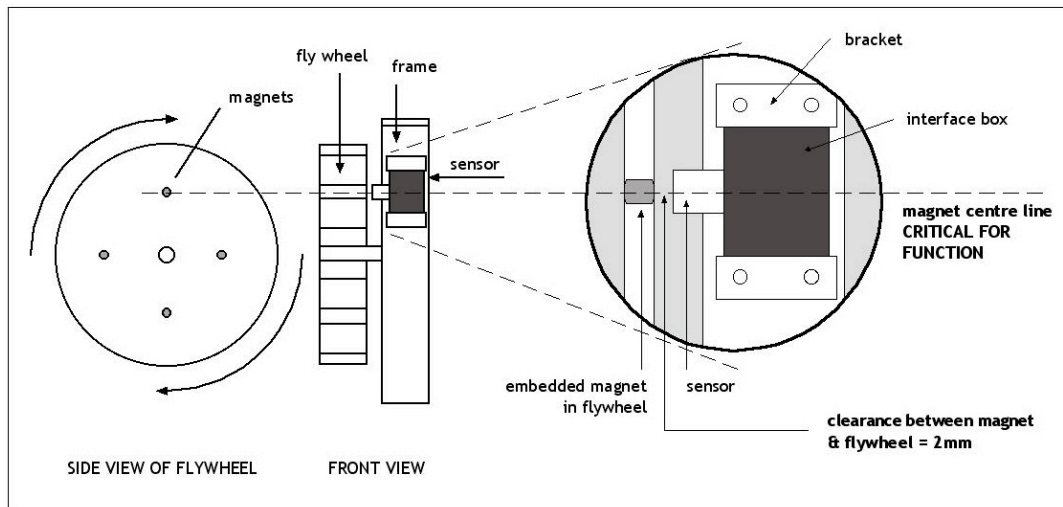
The interface is a small black box (75x57x25 mm) with a small white cylinder protruding from it (the sensor). The sensor is sensitive towards magnetic fields. Its active spot is very small, and is situated in the centre of the extremity of the sensor. For proper functioning of the interface it is essential that the active spot of the sensor is positioned on exactly the same circle as the magnets in the flywheel that activate the sensor. The distance between sensor and flywheel should be between 1 and 2 mm.

Place the sensor and interface into the right position as follows:

(If you are aligning the sensor for the first time it may help to lay the rowing simulator gently on its flywheel side, which makes it easier to see the magnets in the flywheel)

- The interface comes with two mounting brackets.
- Unscrew the screws in both brackets until flush with the inside of the bracket.
- Hook the brackets with their bent rims pointing towards each other, under the lower rims of the main frame.
- Take the interface, put it with the sensor side pointing towards the flywheel and to the main shaft.
- Insert the interface between the two brackets.
- Push both brackets firmly around the interface, slide the interface into position such that the magnets pass directly under the centre of the sensor.
- Make sure the distance between the top of the sensor and the flywheel surface is between 1 and 2 mm, and the interface body is parallel to the flywheel.
- Tighten four screws gently to fix the brackets, and thus the interface, in the proper position.
- Put the rowing simulator upright again.

If using RPW GoTo Section 2 of the Quick start guideRPW. RPW manual available with software or online at www.rowperfect.com



2. ROWPERFECT DOS SOFTWARE

The ROWPERFECT interface and software will operate on any PC capable of operating under DOS and with a processor 386 or higher, and provided with a diskette drive and a serial port. The program comes on a bootable diskette and can be loaded from the diskette drive.

Chances are that the program will not run correctly under a Windows generated DOS prompt, as Windows can interfere with the program's interrupt routines. We recommend that files be stored on diskette, with each user having his or her personal diskette. For instructions on using the Rowperfect software on computers with versions of Windows 2000 or later, please PROCEED TO THE INSTRUCTIONS AT THE END OF THIS SECTION.

Types of files - The program uses different files:

.ini files.

These files identify the user, the type of training that is going to be performed, the allocation of the numerical displays, the choice of parameters in the work screen, and the colours of the screens.

.ses files.

These files record the information of a training session.

.str files.

These files record the information of certain strokes.

Text files.

.ses files and .str files can be converted to **ASCII** text files for export to other programs such as Excell or Lotus.

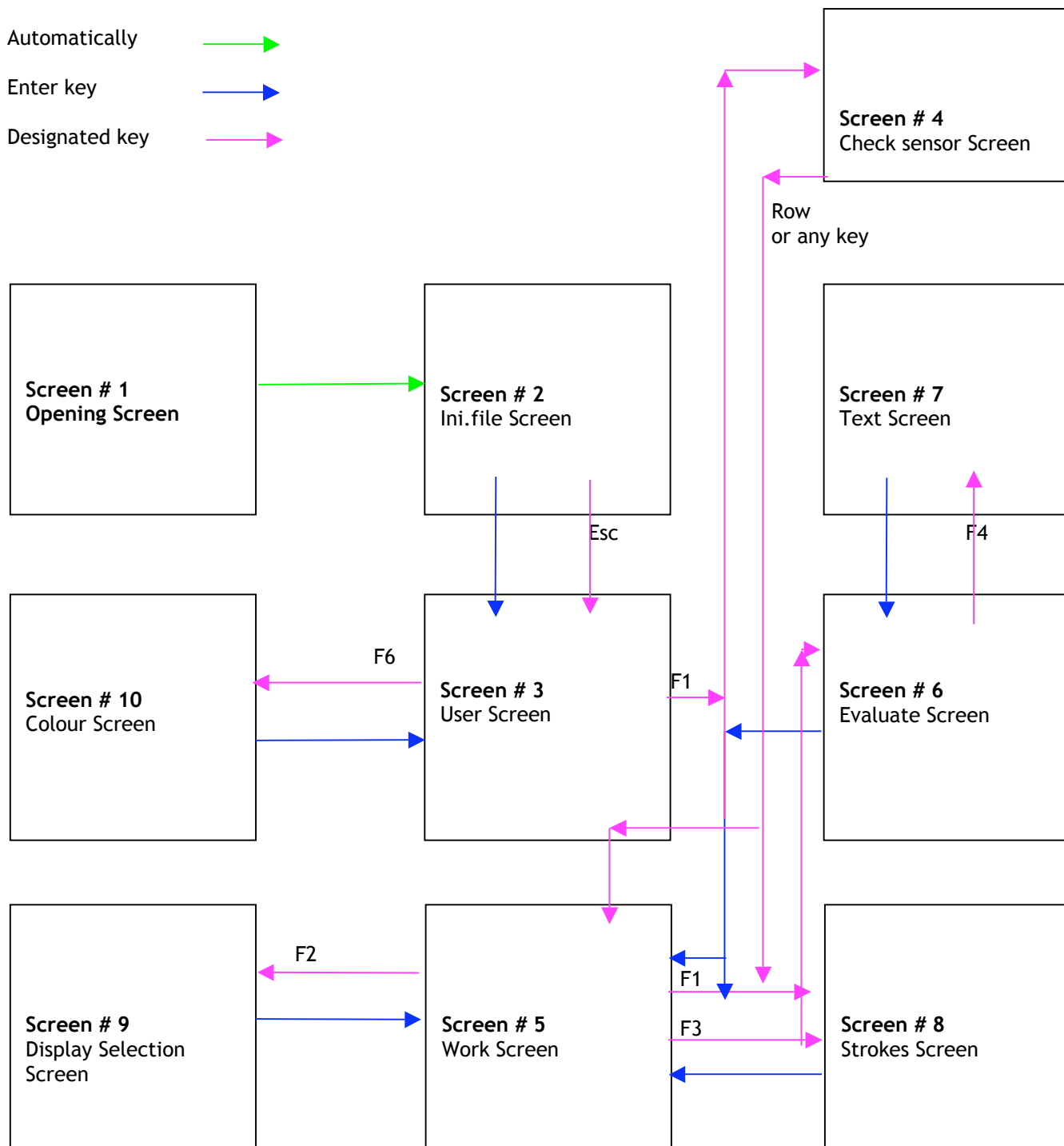
SCREENS

The unit has a total of 10 screens with the following main functions:

SCREEN	MAIN FUNCTION
Opening Screen	Connection test
Ini file Screen	Loading existing .ini files from disk
User Screen	Definition of the user and of the training, composing, loading and saving .ini files
Check sensor Screen	Alignment check of the sensor
Work Screen	Numerical and graphical display of performance; navigating screen
Evaluate Screen	Saving and loading .ses files, allocating parameters to the axis of the performance graph.
Text Screen	Converting .ses files to ASCIIfiles
Strokes Screen	Analysing, saving and loading stroke profiles
Displays screen	Allocating parameters to numerical displays
Colour Screen	Allocating colours to fields, characters and lines in the other screens

The relationship between these screens, their functions and their method of operation is described in the following paragraphs and the relational diagram below.

RELATIONAL DIAGRAM OF DOS SOFTWARE.



Actions prior to start-up.

Connect the interface with the interface cable to one of the COM ports of the computer. (Optionally connect the pulse sensor to the interface plug.) Insert the Rowperfect diskette into the A: drive - alternatively the software may be copied onto a CD or the hard drive of your computer, but only if the hard drive is running a version of Windows prior to Windows 2000. For instructions on using the Rowperfect software with later versions of Windows, see "RUNNING CARE DOS VERSION WITH XP OPERATING SYSTEMS" on page*****

Before starting to row, the proper positioning of the sensor should be checked. To do so proceed as follows:

Connect the interface to the COM port of the PC by means of the 9 P 6 interface cable.

Put the CARE ROWPERFECT diskette into the a:drive and switch the power on.

The system starts, and a screen is presented asking to enter a file name - instead press the <Esc> button, followed by the <F1 Accept> button.

The system then presents the **Check Sensor Screen** with the text **TAKE CARE ROWPERFECT**, and the computer gives a **beep** approximately once per second.

Slowly turn the flywheel. If the sensor is correctly positioned, an **additional beep** is heard for each magnet passing the sensor. (Four in a whole turn of the flywheel).

If no additional beeps are heard, or not every magnet produces a beep, the sensor needs re-adjusting.

If the sensor is correctly adjusted, and four additional beeps per turn of the flywheel are heard, making **two full strokes** the screen will change to the work screen, and the left hand part of the screen will give a force/length stroke profile.

Note: The interface derives its energy from the COM port, no batteries are needed. As the ROWPERFECT software interface uses the voltage on some of the COM port contacts they should be at the standard serial port convention value. Existing programs (e.g. Windows) or too low batteries (when using a laptop) may interfere with this procedure. If this is the case, erratic graphs will show on the screen at low power output.

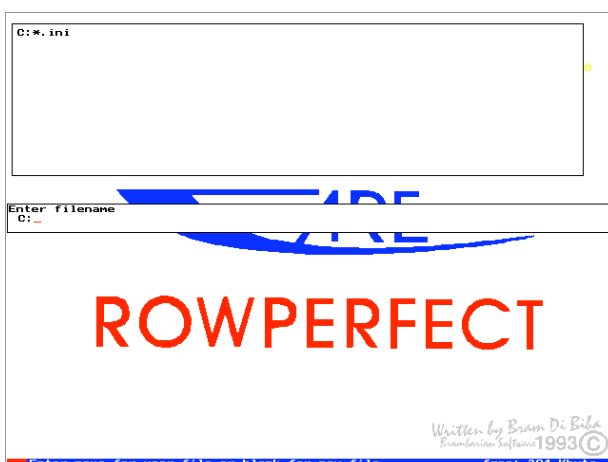
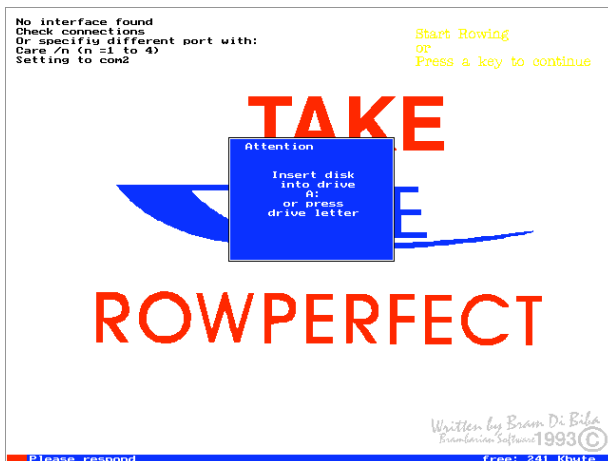
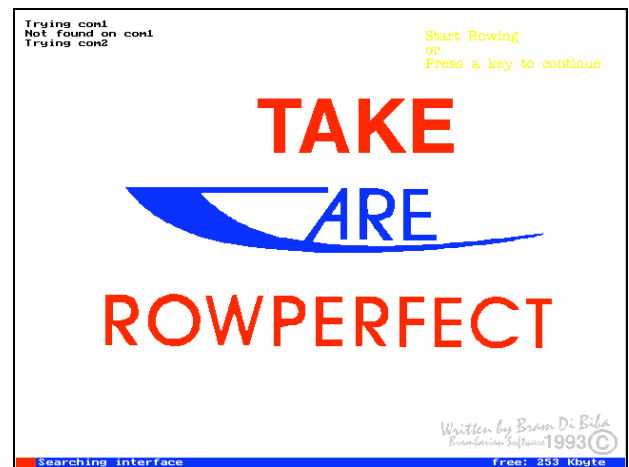
If a laptop computer is used, to ensure the correct COM port voltage, it is recommended to run the laptop directly from the mains adaptor.

Should your computer not have a Com (Serial) port, alternatively the RPW (Rowperfect for Windows) software can be used via the USB port. Contact your Rowperfect agent for details.

As the internal memory of the computer allocated for storing information under DOS is limited, the system tends to run out of storage after approx. 50 to 55 minutes, depending upon the stroke rate. If that occurs, the programme jams and the computer has to be switched off to be restarted. In doing so, all the session information is lost. **Therefore, if longer sessions are going to be made, it is advised to save a session file on diskette after approx. 45 minutes and then reset the system by pressing F4 RESET.** If for some time a training session is interrupted, use the SPACE BAR to pause the system to prevent the system storing zero's unnecessarily.

Start-up

The program diskette is a system diskette. If the computer is **switched on** with this diskette **in the a: drive**, the DOS system including the DOS GRAPHICS command, necessary to make screen prints (with a DOS compatible printer only) and the ROWPERFECT programme are automatically started. If the computer is already operating, activate the MS-DOS prompt. Insert the diskette into drive a:, activate drive a: and type CARE followed by pressing the <Enter> key. If prints of the screens and graphs have to be made load DOS GRAPHICS.



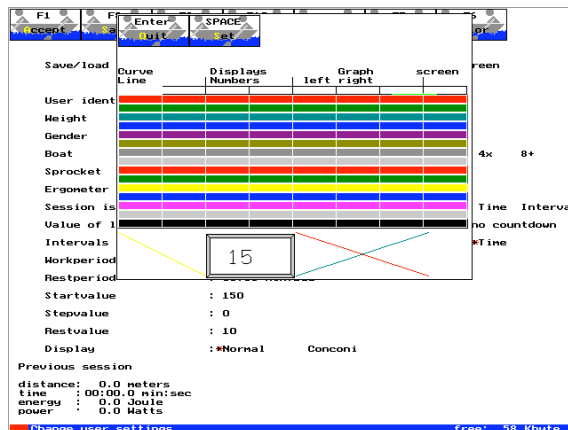
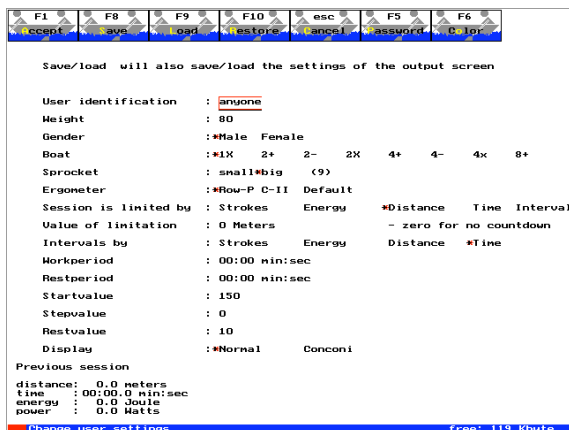
User Menu

The USER MENU is meant for loading existing .ini files, or for making new .ini files by identification of the user, selecting the type and duration of training, to allocate certain parameters to displays and to the axes of the performance graphs, to change the colours of the screens, and to save the selected settings as a new .ini file for future repeated use. Normally all the files are stored onto the a: drive automatically, to protect the hard disk against pollution.

The PASSWORD OPTION allows the user to save files to the c: drive.

The initial password is CARE.

All selections on the screen are made by moving the cursor to the required position and pressing ENTER, followed by typing the relevant information into the answering box, followed again by ENTER. In doing so, the information from the previous work-out still in the memory is destroyed. If this information is still to be saved, answer NO and go to the EVALUATION SCREEN by pressing F1 twice, pressing F8 and naming the file and pressing ENTER. To return to the USER SCREEN then press Esc followed by F6.



User identification.

To introduce a new user to the system move the cursor to "User identification" and press ENTER followed by typing the user name and ENTER.

The weight, gender, boat and sprocket data are used to calculate a weight-corrected time and boat speed. These times are close to the real times made in the chosen type of boat under ideal conditions with technique in the boat near to perfect.

The small sprocket of the rowing simulator is the left one, the big sprocket is the right one, nearest to the fan.

Type of training.

The type of training to be performed by the oarsman can be chosen by giving a certain amount of work to do or by indicating a particular intensity. The amount of work can be expressed in terms of STROKES, ENERGY, DISTANCE or TIME. The chosen parameter then is counted down from the limitation value down to zero. [A limitation value set to zero will cause the system to count up instead of counting down.](#) At the end of the session the results are presented in DISTANCE, TIME, total ENERGY (Joules) dissipated, and POWER (average over the total session in Watts).

If the INTERVALS option is chosen, the number of intervals, and the units in which the intervals are going to be counted down, the required POWER during the interval, POWER during the rest period, as well as an incremental value per interval can be selected. Note: Always choose the number of intervals one higher than the number to be rowed at low speed.

The CONCONI option for the display automatically selects a special display arrangement for this type of test.

When USER IDENTIFICATION and TYPE OF TRAINING have been selected press F1 **Accept** to go to the **Check sensor screen**. At this stage a regular BEEP is heard. *If correctly aligned additional beeps are heard every time a magnet passes a sensor at low speed.*



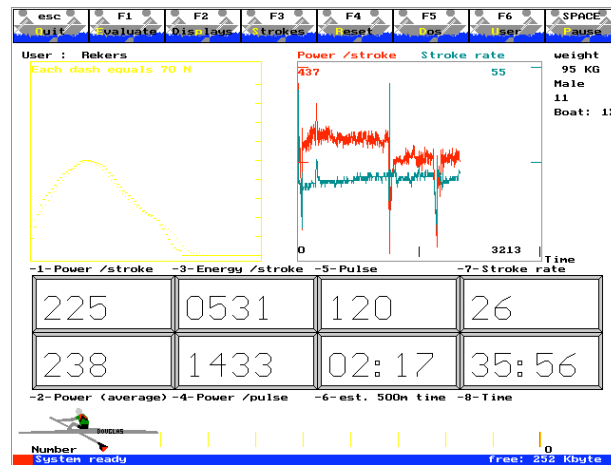
Pressing any key, or starting to row will switch the screen to the WORK SCREEN (III).

The work screen serves to provide the user with direct biofeedback on his or her performance, and serves as a navigation screen to other menus

DISPLAYS AND PERFORMANCE GRAPH PARAMETERS.

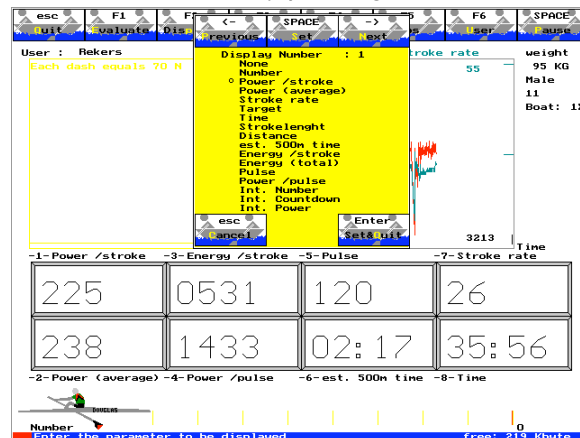
The work screen

The Workscreen provides the user with a real-time force/length stroke profile for every stroke rowed, with the option of a template curve, 8 numerical displays with a selection of performance parameters and evaluation graph. It is an unprecedented tool for improving technique and synchronising crews off-water.



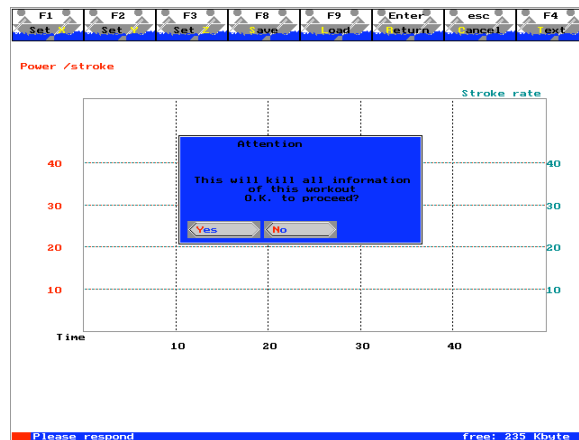
Displays (F2).

Check if the information on the 8 numerical display fields is the information that is required. If not, the setting can be changed by pressing F2 DISPLAYS, and by using the cursor keys, selecting the display number and the parameter to be shown on that display. Set by pressing the SPACE BAR if more than one display has to be changed, or else set and return to the WORK SCREEN by pressing ENTER.



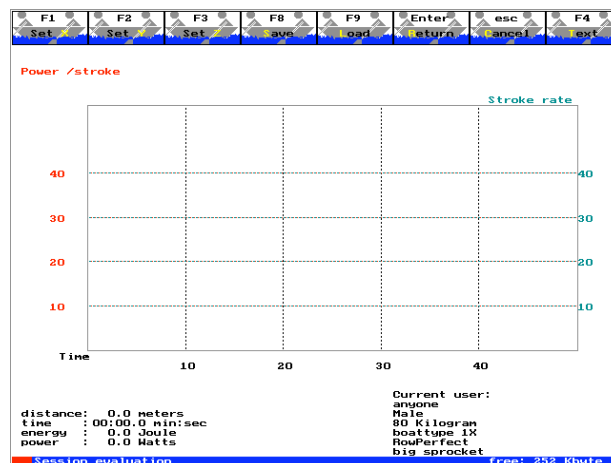
Evaluation graph (Athlete data logging facility) (F1).

For selecting the variables for the axes of the performance graph press F1 EVALUATE and select for each axis the relevant variable by using the cursor keys.



On the graph, the name of the selected variable and the grid value should be visible. Once the proper selection is made return to the WORK SCREEN. Note: If a black and white screen is used, it is possible that one or more variables will not show on the screen. If this the case, after selection press ENTER to return to the WORK SCREEN followed by pressing F6 to go to the USER SCREEN. Subsequently press **F6 COLOR** and make selections for Graph left and right. The result of the selection is shown at the bottom of the screen.

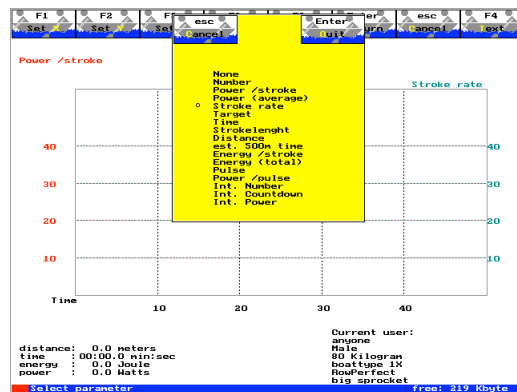
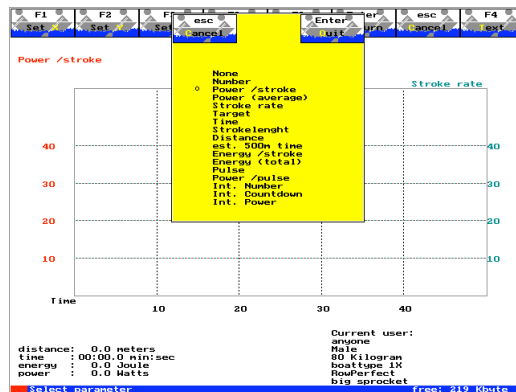
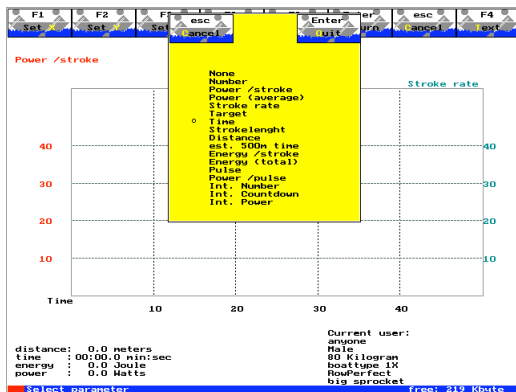
Then return to the WORK SCREEN by pressing ENTER and **F1 ACCEPT** subsequently, to check the results. If not satisfied, repeat the procedure and choose a different colour, if satisfied, press F6 USER to return to the USER MENU. In this menu then the .ini file, thus composed, can be saved by pressing F8 SAVE and allocating a name to it. This action then saves the user identification, the training menu and the screen settings that have been selected. By pressing **F1 ACCEPT**, the WORK SCREEN is reactivated and the training can start.



Evaluate menu

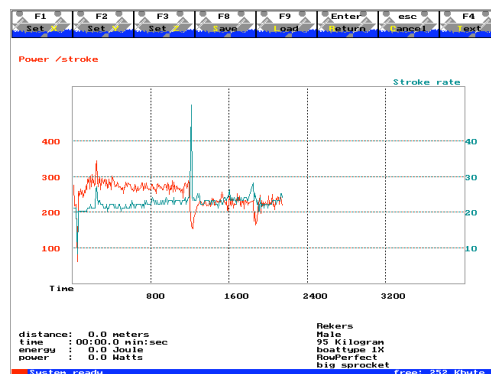
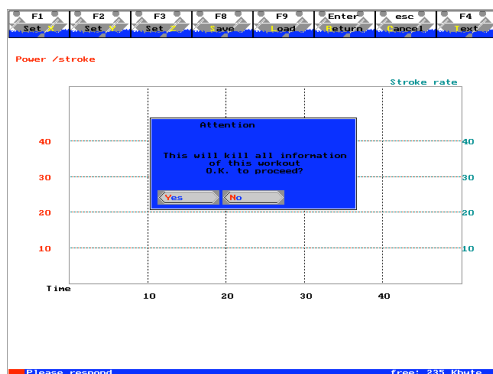
The evaluate menu can be used to evaluate a session just performed, by choosing the appropriate variables for the axes of the evaluate graph. If before start-up of the system DOS GRAPHICS has been loaded, prints of the graph can be made on a DOS compatible printer, by pressing PRINT SCREEN. A session file can be saved by pressing **F8 SAVE** and allocating a name to the file. The file is then saved on disk.

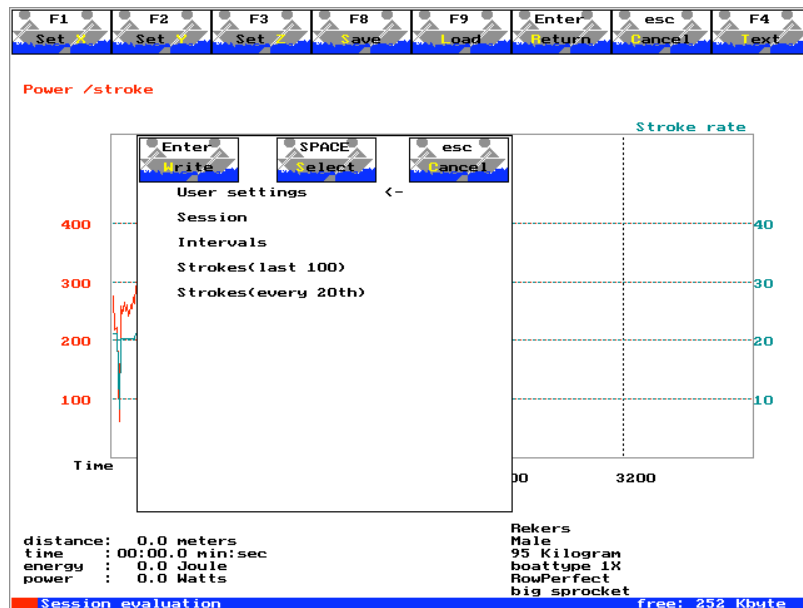
A file on disk can be evaluated from this menu, by pressing **F9 LOAD**. In doing so a list of .ses files under the actual .ini file is presented, from which list a selection can be made. For session files connected to other .ini files please first load the relevant .ini file in the user menu.



Exporting files

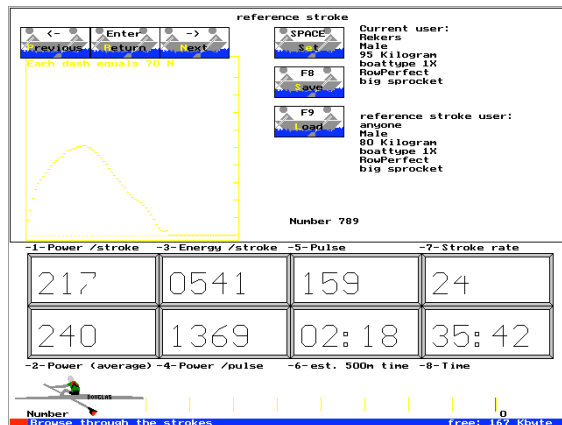
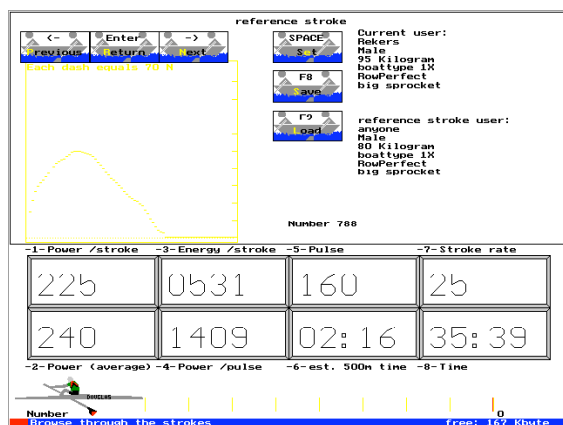
In the Evaluate Menu, session files can partially or wholly be converted to ASCII files via F4 TEXT. These files then can be imported into spreadsheet programmes such as MS Excel for further processing.





Strokes Menu

The stroke profiles of up to 200 strokes are stored in the memory during a session. As soon as more than 200 strokes are being made, the program starts at the beginning of the session skipping 19 strokes out of every twenty, thus storing every twentieth stroke of the first part of the session and, for as long as possible, every stroke of the last part of the session.

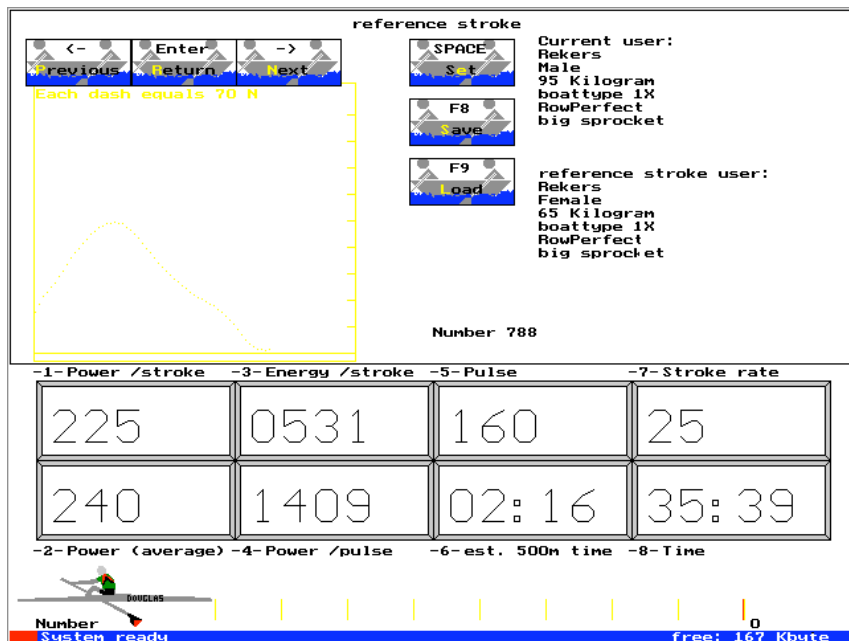


One can enter into the STROKE MENU starting from the WORK SCREEN by pressing **F3 STROKES**. By using the cursor keys one can browse through all the stroke profiles of the session at hand, which have been stored in the memory.

Pressing the SPACE BAR will set the selected stroke as a reference stroke in the WORK SCREEN, as well as on the STROKE MENU SCREEN. On the WORK SCREEN however the reference stroke will only show after a new stroke has been made.

Pressing **F8 SAVE** will save the selected stroke to a .str file under the name given.

Pressing **F9 Load** will present a list of .str files which can be loaded from the disk to serve as a reference curve.



When the correct reference curve has been selected, press ENTER to return to the WORK SCREEN.

TAKE CARE, ROW PERFECT !

4. USING ROWPERFECT (DOS VERSION) WITH XP OPERATING SYSTEMS

Difficulty will often be experienced when trying to use your simulator interface when connected to a computer running an XP operating system. The easiest solution is to utilise your personal computer as an extension of your Rowing simulator by suspending the initiation of the operating system for the period of your rowing session.

This is most easily achieved by ensuring your computer is started from its fully closed down state before attempting to run your ROWPERFECT simulator computer program.

This requires that your computer access its "Floppy" (or CD) drive before the operating system is loaded.

To test if your computer operates this way, follow these steps:

- 1/ Ensure your computer is powered down.
- 2/ Connect your interface cable to the Com port. Com port (1) usually.
- 3/ Insert your ROWPERFECT simulator disk/CD into the floppy/CD drive.
- 4/ Turn your computer on.
- 5/ If the computer starts up showing the ROWPERFECT Simulator Screen, then no adjustment is required for your computer.

If your Computer fails to access the floppy drive and initiate the ROWPERFECT simulator Program then you will need to reset your Computer BIOS program so that it checks its floppy drive before starting any other checks for operating programs. This can be done as follows:

- 1/ Start your computer from a powered down state.
- 2/ Within the first few seconds, as the Computer starts and displays its start up dialogue, press the **delete** key. This will interrupt the set start routine and divert you to the BIOS routine common names for this are "CMOS Setup Utility" or some other reference to a Setup Utility .
- 3/ Tab to the "Advanced BIOS Features" or "BIOS Features setup" or if neither of these are present, then to the closest sounding name to the above and press "Enter"
- 4/ On the "Advanced BIOS Features" screen Tab to the "First Boot Device" position. This position should read "Floppy". If it does not then record exactly what is written in this position. Type "Floppy" at the First Boot Device location. Then press "Enter". Typically the second boot device should read "HDD" or a similar reference to the drive where your XP operating system is stored. The second boot position should now have entered the details that had been set for the "First Boot Device" then a comma (,) followed by the devices that had been entered in the order that they appeared starting from the first to the second boot devices. Typically the Second boot device might read "HDD,SCSI". Press "Enter" after making your changes.
Then press escape.

For the situation where the screen you are now on followed "BIOS Features setup" the area to Tab to may read "Boot Sequence". Similar named location may exist where neither of these terms is used. At the Boot Sequence location ensure the first entry reads "A" when this is the letter used to refer to your Floppy Drive. A comma (,) must follow immediately then followed by the sequence that was present prior you having entered "A,".

The reading might then look like "A,C,SCSI"

- 5/ Press "Escape"
- 6/ The "CMOS Setup Utility" should be displayed. Tab to the "Save and Exit Setup" position and press "enter".
- 7/ Power the Computer down.

This should now have completed the Floppy setup so that it now is checked prior to the start up of the Operating System.

GETTING THE MOST FROM YOUR ROWPERFECT

1. TRAINING ON THE ROWPERFECT

In broad terms rowing training can be divided into four categories:

- **ENDURANCE TRAINING** - 20 minutes or more at generally lower stroke rates, with the aim of increasing muscular and cardiovascular endurance, or resistance to fatigue
- **ANAEROBIC THRESHOLD TRAINING** - 6-12 minute pieces at higher intensity, rating say 22-30 strokes/minute (SPM) with the aim of increasing the body's ability to use as much oxygen as possible
- **SPEEDWORK** - Short pieces at high stroke rate (32-40+ SPM) which aim to train the body to dispose of lactic acid, and train the nerves and muscles to function optimally in a race
- **POWER STROKES** (and other resistance training) - Training against an increased resistance load to strengthen the muscles and other structures (ligaments, tendons, even bones) Pieces of between 10 and 50 strokes. A high proportion of resistance work, perhaps 75%, should target the neuromuscular system in exercises using movements *as similar as possible* to the actual sport ("Sport Specific"). The exact proportion of loading is often argued about, but the well-known swimming coach Gennady Touretsky believes that a figure of around 10% above the load encountered in the actual event trained for is optimal. This happens to be the exact difference between the heavy (left) and "normal" (right) drive cog on the Rowperfect

WHY DO WE TRAIN?

The real question is: Why not? Hundreds of studies have confirmed the benefit of cardiovascular and strength training for almost all people. Whether it is for better vascular, mental or general health, exercise is good for you. A recent study proved that vascular disease begins in children as young as ten years old if they are sedentary and overweight, *but the changes were reversible with exercise*. The same may well be true for adults.

Put simply: Exercise makes us feel better, function better and look better.

RECOMMENDATIONS

Before any physical activity program is undertaken you should consult a doctor. If in any doubt about your physical health, a medically supervised stress test is a wonderful idea.

There is abundant evidence to show that 3 aerobic exercise sessions every week is a good long-term strategy. Rowing is probably the best total body exercise you can do, utilizing virtually all the major muscle groups, and using less cycles per minute of exercise than any other activity (less wear-and-tear for your joints) With practice, you can get even greater benefit by monitoring your breathing pattern (as described below under Measuring Lactate)

Rowperfect's unique dynamic action makes your training safer while giving you the true rhythm of a lightweight single scull floating on water. Other rowing machines actually simulate a boat which doesn't move at all - almost the definition of a pointless activity.

Before any exercise, warm up with general stretching, followed 40-100 "BICYCLES" lying on you back, followed by some lateral raises with each leg while lying on the floor. These exercises will improve core strength and proprioception.

LACTATE AND EXERCISE - BREATHE UP!

When we exercise, we use two major energy systems. The first type is the **aerobic** (with oxygen) system, which is very efficient, and produces only carbon dioxide and water as by-products. Exercising aerobically means exercising at a level where the aerobic system is the predominant system. It is where most of us should exercise, most of the time.

The second system is the **anaerobic** (without oxygen) system. It is twenty times less efficient than the aerobic system (that is, it uses 20 times more fuel for the same energy production) and produces **lactic acid (lactate)** as a by-product. Too much anaerobic exercise is potentially dangerous - the body's energy reserves are rapidly depleted, and high acid levels in your blood probably directly damage your white blood cells, the body's defence against infection. Taken together, it is easy to understand the illnesses which occur in over-trained people, especially if combined with inadequate rest.

Measuring Lactate

In reality, both energy systems are always working, but when we go past a certain point (the **Anaerobic Threshold**) the use of the anaerobic system greatly increases, and the aerobic system is already at maximum capacity. This point can actually be measured in a number of ways. One method involves collecting a blood sample during or straight after exercise. The blood lactate level can be measured, and values above 4 millimoles per litre of blood indicate the anaerobic system is activated. During vigorous exercise, values as high as 20 mmol/l are not uncommon.

A much easier method of measuring your personal anaerobic threshold involves learning to monitor your own **breathing pattern**. With practice this is actually quite easy. When your exercise intensity pushes you beyond the AT, you will rapidly "lose control" over your breathing - it becomes fast and irregular. You may also feel the muscles of your face contracting, as your body tries to open your airways (which include the nose of course) as wide as possible. At this point, simply drop the intensity of your rowing, or even rest completely, until you feel your breathing pattern return to a controllable level. Most people find they can learn to monitor and control their breathing pattern within a very short time, despite never previously being aware of it at all!

How do you identify when you have passed your AT?

Your breathing rate suddenly increases, and you rapidly feel uncomfortable. So - begin to use your breathing pattern as a guide. If it is deep, steady and regular, you are OK. Try to hold this breathing pattern for as long as possible. When you can no longer avoid rapid uncontrolled breathing, break down the effort until your breathing recovers properly. Once you are accustomed to monitoring your breathing this way, it will become a habit, and you'll never lose this ability to monitor your exercise intensity.

USING THE ROWPERFECT FOR MAXIMAL BENEFIT

WITH FEEDBACK OR WITHOUT?

This may sound unusual, but some sessions should be done without electronic feedback - or with only sporadic use in any case. Too many of us are "addicted" to constant numerical based assessment of our progress - we need to stop competing with machines (we can never win) and learn to train mostly using rhythm and perceived exertion as our feedback. We have the most sensitive monitor ever built within our own body - why not use it? This is especially true of longer sessions, where the danger of over-training is greatest. Nevertheless, we all like a structured approach to training at least as a guide, so here are some suggestions:

ENERGY PER STROKE

One of the great features of the Rowperfect software is the Energy per Stroke feature. As a general rule, aim to maximize the ENERGY PER STROKE (Which is the work done every stroke). That way, you will achieve maximal strength gain for every stroke done. By changing the rate you row at you can then vary the intensity of every workout or part thereof. The intensity is best measured by the POWER produced.

For example: Row

er 1 at rate 20 (1 stroke every 3 seconds), averaging 600 joules per stroke, is producing 200 Watts, ($600/3=200$)
Conversely, Rower 2, also averaging 600 joules, but rating 30 (1 stroke every 2 seconds) is producing 300 Watts ($600/2=300$)

The bad news is that there is no absolute rule here - you will have to experiment to find whether you are a "diesel" (low rate/big strokes), "petrol" (high rate, smaller strokes), or somewhere between. The only way to really find out is to do the hard work - but at least the above examples give you a starting point.

PROPRIOCEPTION

Proprioception is best described as how things "feel". It is the combined feedback from our bodies which tells us the tension in our muscles/joints/tendons, and the inertial forces we are experiencing (balance and momentum transfer in the case of rowing, but more complex in a diver in the middle of a twisting triple!). Proprioception is a combination of General System (effectively **tension and pressure** receptors in the muscles, tendons and ligaments) and Special System (middle Ear receptors - **balance/momentum**). The proprioception benefits of the Rowperfect are particularly obvious in the sport of rowing, but there is abundant evidence that development of proprioceptive systems is beneficial for other sports: If you can learn to row a particular Force Curve on the Rowperfect, it really could improve your ability to control your golf swing/kick a football/land after leaping to take a high mark. May seem implausible, but it is true.

MUSIC

A recent study showed that power output in athletes involved in aerobic exercise may increase by up to 7% when music is included in a training session. Imagine a supplement which could achieve a similar improvement - it would sell better than hotcakes! We encourage anyone to include music in almost any session, particularly for longer pieces. Live recordings work well - but we are all different, and you should use whichever music you enjoy - if you actually enjoy it at all!

SESSION SUGGESTIONS

<p>ENDURANCE 20 minutes up to 90 minutes</p>	<ol style="list-style-type: none"> 1. Continuous (with self-monitoring) 2. 3'firm 1'light (or similar variation) 3. 2'@16-2'@18-1'@20x5-10 4. Counting strokes: Start at 10 firm 10 light, to a total of say 100 strokes, then gradually increase the number of firm strokes as fitness improves - 5. Pyramids: 1 firm, 1 light, 2firm, 2light etc - up to 35 firm and back down (maximum 20 light) 6. Music - row firm during a song, and light or total rest between songs *** 	<p>For general health and cardiovascular well-being</p> <p>-should form about 75% of your total training load in one form or another</p>
<p>POWER STROKES</p> <p>*Using the smaller cog, or a substantially smaller disc than the one normally used *Advanced rowers only - suggest at least two months of regular rowing training before attempting these sessions</p>	<p>Various combinations between 10 to 50 strokes at maximum pressure, with equal or greater rest between sets.</p> <p>Total number of strokes between 150 and 600 depending on intensity</p>	<p>For more advanced rowers. Aim is to at least partially replace resistance training with weights, though an increasing number of successful rowers now use it as their major or even sole form of strength training.</p>
<p>ANAEROBIC THRESHOLD TRAINING</p>	<p>2-6 pieces rating 20 or more strokes /minute, almost maximal pressure (High E/stroke).</p> <p>Duration of pieces between 3 and 12 minutes, for a total of between 10 and 30+ minutes E.g. 3x10'; @20/22/24/26 (4',2'.2',2') 3x8'@22/24 or 24/26 (4',4') 6x3'@26 and so on</p>	<p>The most effective way to increase the VO2 (Maximal oxygen uptake, with the added benefit of encouraging greater stroke efficiency - the rower strives for greater speed by whatever means from a limited resource: his or her body!</p>
<p>SPEED TRAINING</p>	<p>15 TO 60 stroke pieces at high(>30SPM) rating A good variation is a pyramid of racing strokes from 1-35 with equal rest</p>	<p>Neurological training - efficiency of movement as well as physiological training - increasing tolerance of high blood lactate levels. *Should form probably the smallest component of any training regime - utilizes large amounts of energy via the anaerobic system, and thus very stressful.</p>

2. WHY ROWING?

Avoiding muscular imbalance and pattern overload

Some biomechanical experts now think that today's high-tech resistance machines may not be as beneficial as first thought. In fact, by isolating muscle groups, they may even increase the long-term risk of injuries and **movement dysfunction**. Humans have evolved to be specifically designed and adapted to very complex movement patterns - our bodies are designed for these movements, and there is abundant evidence of positive psychological responses to such activities.

Compare the very restricted movement possible on most exercise machines, which pre-determine both the plane and the axis of movement, with a rowing stroke on the Rowperfect (or in a boat) where balance is also demanded. The brain must send exactly the right pattern of signals to the various muscle groups at precisely the right moment to ensure the stroke is carried out efficiently. The load is shared by the whole body, rather than restricted to one joint or muscle group. The control of the muscle movements (called **motor recruitment patterns**) is obviously a much more complex job for the brain - which was after all developed to control such patterns.

Rowing is one of the most satisfying exercises - and in terms of the number of large muscle groups used, probably the most complete exercise of all. During every stroke cycle, we use all or most of the full range of movement of the legs, buttock muscles, lower and upper back and of course the arms. While these muscles are working, the **Core Stabilisers** including the abdominals are working to allow the transfer of all that work to the oar handle. And in the boat or on the Rowperfect Limited Tilt seat, we must simultaneously centre the body mass, ensuring an equal load on the spine and introducing the crucial element of balance.

The end result is a true total body exercise which can train strength, plus muscular and cardiovascular endurance, while spreading the load over the greatest possible number of joints.

3. ONE-LEGGED ROWING USING THE ROWPERFECT

Develop Core Strength, Eliminate Bilateral Deficits, Recover From Injury Faster

Much recent research points to the benefits of exercising one limb, and particularly one leg, at a time. Bilateral Deficits (BDs) - an imbalance of strength between limbs - are very common. We nearly all have a preferred hand/arm, but often fail to realise we also have a preferred leg as well - we place unequal weight on our legs when standing and so on. The Rowperfect, perhaps more than any previous exercise machine, can be used to identify AND CORRECT bilateral deficits. Simply remove one foot from the foot-straps and rest it on the floor, slightly to the side. By regularly doing 20-30 strokes one-legged before each session (whether on- or off-water session) you should rapidly find the strength evens up. You may find that as a result of the increased awareness you have developed, that your general posture improves. and this alone has been known to improve some longstanding lower back problems. The Rowperfect, especially with the Force Curve demonstrated by the interface, can both identify and (with qualified direction) correct BDs. BDs are implicated in the development of chronic back pain and certainly eliminating them is likely to improve the performance of any athlete, especially if that athlete happens to be a rower who has been subconsciously applying unequal pressure with his feet, or a tennis player who favours one leg, and so on.

And whether we have a bilateral deficit or not, there is no doubt that rowing the Rowperfect one-legged will certainly **increase Core Stability** - often in a surprisingly short time, as the rower is quite literally forced to brace the core in order to take even a single stroke.

How can one-legged rowing assist recovery from injury? Thanks to a well-documented nervous system adaptation known as **cross education** - the nerves of a limb or muscle group are stimulated when its pair is exercised - the Rowperfect can be used to train the opposite leg as part of a recovery program. Of course as the injured leg recovers, it will be exceedingly easy to monitor the true gains in both strength and coordination of that leg by using the Rowperfect Interface force curve!

"When you row several minutes with just one leg, you also notice how much the glut muscle is needed for a proper leg-drive-power-application! This brought me to notice that rowers in general have an imbalance between the size of the quadriceps and glut which also could lead to back pain."

Xeno Muller, Olympic Champion Single Sculler, 1996, Silver Medallist 2000

4. MUSCLE MOVEMENT PATTERNS - A (VERY) BRIEF SUMMARY

Our brain controls our movements in many different ways. However a few areas control most of our movements, and this is particularly true of learned patterns of movement (walking, running, swimming, rowing, and so on).

When we walk, we do so subconsciously, only adjusting our habitual pattern to compensate for uneven ground or say, adverse weather. The same is true for all our other learned patterns - we have initially learned, perhaps very slowly - to master a movement, then we store it away. Some very complex movements like rowing or playing a musical instrument are being continuously refined.

How do we learn these patterns, where are they stored, how are they controlled?

The most basic movements - say the control for extending our knee by using the quadriceps - are controlled initially from the **Motor Cortex**. As we produce a more complex movement, say walking, we store the motor (nerve and muscle) pattern in the **Pre-Motor Cortex**, which is right beside the Motor cortex. Now, when the conscious brain sends the message to "walk" this basic pattern is activated, and stays activated until it receives the message to "stop walking". Neither the Motor Cortex nor the person is actually ever thinking about the millions of nerve signals which make up the "walk" pattern.

The patterns in the Pre-motor Cortex are pretty "rough", and the signals are extensively modulated by several special nuclei and a structure called the Cerebellum, before they actually reach the muscles as a smooth pattern. And of course they are modified continuously to allow for steps, obstacles, different surfaces and so on, again without us being aware that the basic pattern is continuing - we simply take in the information (especially via the eyes, balance and proprioceptive feedback) and subconsciously adapt our walk to suit the conditions.

Of course every walk is individual, and the same is true of a rowing stroke - every individual will have an individual signature pattern (although in a crew, each must make some changes to optimise the overall result). To produce that "signature" pattern requires many strokes; to modify it will often take many more! As every coach knows, the best way to teach any action is to teach it properly, right from the start.

The pattern of movement required for a single action rowing machine is very different to that needed for a boat (see the diagram in Section 1. Introduction) while the Rowperfect almost perfectly simulates it. Why not teach the appropriate movement pattern right from the start? If you regularly repeat an exercise/movement/behaviour your nervous system "primes" itself, and can therefore respond very quickly, easily and economically by performing that action as soon as you decide to do it. (See website "Memory In Reserve").

Whether you are a coach or a rower, produce the best possible movement pattern off the water. Practise it, Perfect it, Automate it. Then, whether you are on the Rowperfect or on the water: Enjoy it!

5. ROWPERFECT LIMITED TILT SEAT

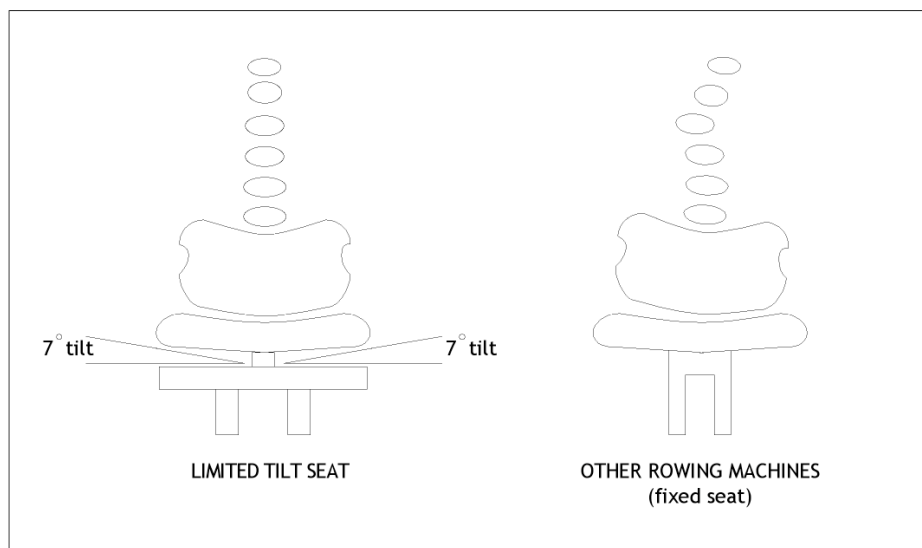
A rowing shell is very finely balanced, sitting as it does on water with the rower on a small seat and with one or two oars in his hands. One of the great benefits of on-water rowing is the development of balance skills. These skills enhance the development of the core strength muscles of the spine and abdomen and their refinement forms an essential part of the challenge of on-water rowing.

The other important benefit of sitting on a labile (movable) seat is that it encourages symmetrical loading of the spine - balance can only be achieved when loading on each side of the seat is equal.

The very first Rowperfect had a non-tilting seat like standard rowing machines. However, following a discussion with a physiotherapist, Casper Rekers realised that a seat which required balance would be of potential benefit to users - and the **Rowperfect Limited Tilt Seat** was born.

The seat is balanced on four bearings running on the outsides of the main bar. If the seat is unevenly loaded, a tilt of up to 7° is possible to each side - enough to alert the user to that uneven load and then make appropriate changes in his posture and balance to correct it. In a very short time this correction becomes automatic and sub-conscious - a **skill** has been acquired.

Experience with a wide variety of athletes of various abilities, from Olympic rowing medallists to intellectually disabled athletes, has confirmed the value of the Rowperfect Limited Tilt Seat. We at Rowperfect strongly believe that the long-term benefits of our tilting seat are another clear reason for you to choose the Rowperfect Rowing Simulator.



3. HISTORY OF THE ROWPERFECT ROWING SIMULATOR

The Rowperfect was invented by Casper Rekers, whose daughter Marjolein had commenced rowing and found that the machines she was required to train on during the Dutch winter felt very different to her boat. In addition, she felt they placed extra pressure on her knees and back compared to the pressures she felt in the boat. This intrigued Casper because rowing machines had not existed when he was rowing in the late 1950s and early 1960s. He went to the rowing club to try the machines himself and instantly confirmed that they indeed felt very different to a racing shell.

Over the winter of 1988-89, Casper (an engineer by profession) gradually deduced how to reproduce the dynamics of a floating shell on dry land. Casper patented his dynamic action rowing simulator in December of 1988, and the first Rowperfect was produced in December 1988. It proved an instant success when one of Casper's friends, talented lightweight sculler and trainee medical doctor Frans Göbel, happened to try the prototype which Cas had intended to be a one-off for Marjolein's use. Frans said "Can I have one please?" and the production of Rowperfects had begun!

Frans used the Rowperfect extensively during the 1989 season, one in which he had assumed he would be unable to compete due to his commitments as a first year graduate. In fact, for three weeks before the World Championships of that year, he was rostered to hospital duty and therefore unable to train in the boat at all. He found it worked to his advantage:

"I have never told it before, but for three weeks before the World Championships of 1989 I was unable to row in the boat, and rowed exclusively on the Rowperfect. This gave me an advantage over my competitors; because I was able to hone my timing at the catch to perfection, unhindered by wind or waves."

Frans won that World Championship, and won again the following year. When Frans retired, he told his friend Peter Haining about the Rowperfect. Peter went on to win three World Championships (1993-4-5)

"What do I think of the Rowperfect? It brought me three World Championships." Peter Haining

Since then, many crews and scullers have found the Rowperfect advantage to be a crucial element of their training, from World or Olympic champions to school crews, novices and even non-rowers.

**** Patents: U.S. Patent 5,382,210 European Patent 0 376 403 B1**