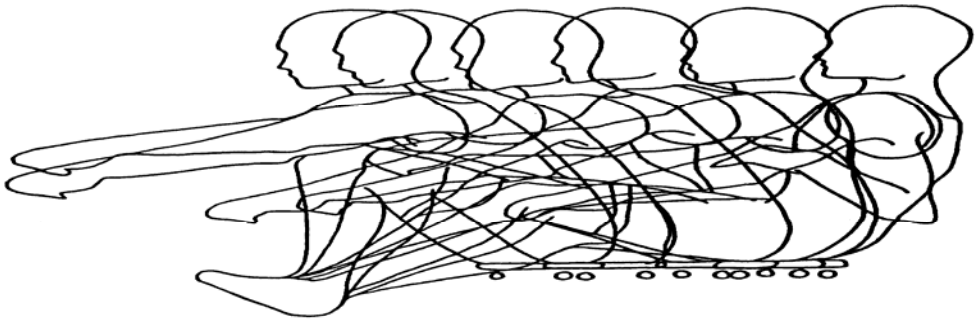
Spracklen's Notes



TRAINING FOR TECHNIQUE

This training System has been designed to provide a variety of methods that are compatible with the process of learning good rowing technique. The methods are not dissimilar to those used by coaches throughout the rowing world, but they have been adapted to encourage the improvement of technique in such a way that technical progress is an important part of the System.

The System originated from the concept that technique should play a bigger part in the preparation of oarsmen for racing. One benefit to be gained from the principle of this System of training is that the drudgeries of winter training become purposeful. The oarsmen become distracted from the hard work they are doing without realizing it!

Mike Spracklen.
October 1987

TECHNIQUE

An efficient technique is essential for the greatest utilization of athletic endeavor. The sport of rowing is a highly skilled activity and even small deficiencies can detract from a rower's performance.

There is more than one way to move a boat fast through the water and gold medals have been won using a variety of different techniques. There is one common factor present in all fast crews, which is that the rowers in those boats apply their power together. As in the old adage, 'a load shared is a load halved'.

In order to achieve efficiency of effort, the oarsperson must be taught to row with identical movements. This is referred to as 'style'. It is for the benefit of all rowing that rowers be taught a uniform style. It is to the benefit of our international squads if a common style is adopted by all.

Technique has played a minor role in Britain during the past decade. In an environment where success is easier to achieve from physical training than by the slower methods of teaching technique, successes at higher levels have been elusive. Improvements in technique would help to improve the performances of our International crews in the world.

FACTORS AFFECTING THE PROCESS OF LEARNING A NEW ROWING STYLE

When trying to adapt to a different technique, whether it is a completely new movement or a change, a rower has more difficulty in controlling his actions in certain identifiable circumstances and the learning process slows down. These problem areas are identified as follows:

1. at high rates of striking

2. at maximum intensity of work

3. in a state of physical tiredness

4. when large increases and sudden changes are demanded

5. when too many changes are to be made at one time

This system avoids the extremes of these adverse conditions. Increases are made in easy stages and only when a rower has shown that he/she is able to cope with the change are further increases demanded of him/her. Training periods of long duration at low rates form the foundation of the System. At low rates the oarsperson is able to control their movements and make corrections as they go when deterioration occurs. The gradual onset of fatigue when training over long distances permits control to be attained. When explosive work is introduced the rower will have built a sound foundation to cope with high demands without loss of form.

The more hours spent on the water practicing a particular movement the sooner that movement will become natural to the rower. This 'grooving in' process is accelerated when the rowers are able to hold good form through long periods of tiredness, but care must be taken to ensure that quality is not lost and that bad faults are not being ingrained. The ultimate test for an rower's technical ability is whether or not he/she can hold good quality when he is under extreme pressure from physical exertion, like the last 250 meters of that one important race!

An outline of the techniques practiced by the men's' heavyweight squad are illustrated in this pamphlet. To explain the training methods which will help to achieve good technique is the purpose of this publication.

TRAINING

Whilst importance is placed on the improvement of technique in this System, the training methods have been devised to provide the best preparation for oarsmen at all levels of competition. Training for the improvement of endurance levels is a high priority. Long outings with variations of low rates are essential for the development of strength coordination and aerobic endurance as well as for 'grooving in' new techniques. This System provides guidelines for achieving a sound physical and physiological foundation for 2000-meter racing.

TRAINING LOADS

Training loads have been prepared so that one method can be compared with another even though the work content may be different. The loads have been derived from a mixture of simple mathematics and the experience of crew training up to the highest levels of competition.

- The methods are based on a normal training load representing 80% of a rower's maximum effort. The suffix 'N' after the method code signifies Normal Training Load.

- Maximum loads are suffixed with 'H' signifying High Loads. High loads are equal to 100% effort and are calculated by increasing a normal load by 25%.

- Reduced loads are suffixed with the letter 'L' signifying low loads and these are generally *25%* below the normal load.

The work methods have been prepared on a time basis rather than on distances. This allows a rower to work at his own pace regardless of the type of boat in which he is training e.g. pair, four or single. The intensity of work is programmed to suit the ability of the oarsmen individually or the squad as a whole.

When no suffix is shown against a Method Code, only one set is required. A numeral before the code will indicate the number of sets to be completed.

An example of a training load for an International oarsman who is training twice a day for six days a week would be, five sessions at 'N', normal load, one or two at 'H', high load, 3 or 4 at 'L', low load with one or two light outings.

REST PERIODS

The recovery periods between sets should be sufficient to allow the pulse rate of an oarsperson, after work, to drop below 120 beats per minute. These rest periods are shown as 5 minutes light paddling, but should be reduced as the rower's physical condition improves with training.

INTENSITY OF WORK

All strokes, unless otherwise stated, are rowed as hard as can be maintained for the session. An important part of the system is that pressure is maintained as the rates rise so that an oarsperson is able to apply maximum output to 200 strokes when he needs to!

AEROBIC/ANAEROBIC CONTENT

All work methods below the rate of 30 are continuous for the improvement of aerobic capacity. Where the stretch of water does not permit continuous work, turns should be made quickly and the work set back by 30 seconds. Work above rate 32 contains a high anaerobic content. This type of work is done intermittently with controlled rests between each set piece.

WARMING UP AND WINDING DOWN

Stretching exercises should be made routine, before and after each session. Thirty minutes of warming up paddling should be done before scheduled work commences. A more specific warm up should be adopted before intensive training so that the body is in a fully prepared condition.

Fifteen minutes of paddling after exercise to wind down is important. Gentle muscular contraction helps the body to clear waste products, which have accumulated in the blood stream during heavy exercise

RATE CHANGES

Rates of striking (stroke rate) are changed by only two strokes per minute at any one time. These gradual changes help the rower to retain technical control during and after the change has been made.

Increases in rates are carried out by generally quickening movements (lively recovery and faster catches etc.) and reductions, by sliding slower forward between strokes.

Rhythm is affected by the speed of the boat. Two or three slightly shorter and quicker strokes will increase boat speed and help the rower to achieve a higher rate whilst maintaining a good rhythm.

It is not easy for a crew to make a rate change and to hold the rate consistently for any length of time. Rates should be checked frequently and adjusted when necessary. It should not be expected that a crew will achieve the rates on every occasion, often the crew will have difficulty in making the change successfully without loss of quality. It is the determination to improve which is of greater value than the actual rate which is scheduled.

HOW THE SYSTEM OPERATES

A particular point of technique is selected in a rower or crew. This may be emphasis on part of the stroke or a correction to an existing movement. Examples would be:

1. Individual fault corrections

2. Rhythm and slide control.

3. Hands, body, and slide movements in the recover.

4. Greater acceleration of the blade through the stroke and stronger finishes

5. Bladework control.

6. A longer reach forward

A target rate is selected and a period of time for improvement allocated in the training program. At the beginning of a winter period the target rate would be 26 or 28 and the time period about 14 days depending on the difficulty of the change

The first outing would be a long piece of work at a low rate. The coach would ensure that the correct interpretation and application of the change during this outing, was accomplished.

Various methods involving rate changes below the target rate are introduced to add flexibility and variety to the program. The rowers have to concentrate on control of movements as rates change up and down. Gradually confidence grows and the change is 'grooved in' at the lower rates.

The rates slowly increase throughout the period. Care is taken by the coach to ensure that when deterioration occurs the rate is reduced until good form is reestablished.

At the end of the period the target rate is consolidated with a long row.

If the desired success has not been achieved, the coach decides from which point the schedule should be repeated or whether a new approach should be adopted. If the crew has been successful the coach will select another point of technique for improvement and a similar process is completed. Even at the highest levels there is always room for improvement. No rower is perfect.

The coach uses his/her skills to decide which point of technique are important. He/she will usually work on the weakest link in the chain throughout the training period, gradually improving one fault after another until his crew has achieved good technique at race rate at the end of the winter.

The rate of improvement will of course depend on the ability of the rowers, their motivation, and degree of difficulty of the change and of course the skill of the coach. Perfection is never achieved and the coach decides which points of technique are worth pursuing and those that are not.

METHODS

The meanings of some words used are as follows:

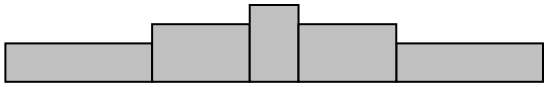
PROGRAM	The complete training program in its entirety
PERIOD	A specified period of time within the program
SESSION	One complete training session from stretching exercises to winding down.
METHOD	The type of work and its content
SET OR SET PIECE	A piece of continuous work normally part of a Method.
QUALITY	Refers to technique
CONTINUOUS	Work done without change of pressure.
INTERMITTENT	Work done with light paddling between each set piece

Note:
"minute" is symbolized by ' … therefore the following: "change rates at 3' 2' 1' 2' 3' 4' - 11' total" -reads as "change rates at 3 minutes, 2 minutes, 1 minutes, 2 minutes, 3 minutes, 4 minutes – 11 minutes total."

DESCRIPTION OF "METHODS"

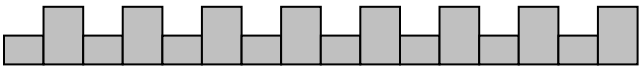
PYRAMID

Change rates at 3' 2' 1' 2' 3' 4' - 11' total.
Rates increase then decrease by 2 at each change.

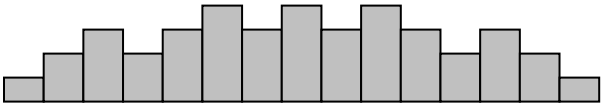


CASTLE

Change rates up and down by 2 alternately every 2 minutes.



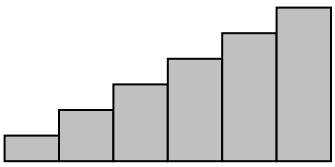
PYRAMID CASTLE



Change rates by 2 at end of each minute as follows: 22,24,26,24,26,28,26,26,26,28,26,24,26,24,22. -15' total.

STAIRCASE

Increase rate by 2 at each stage.



LADDER

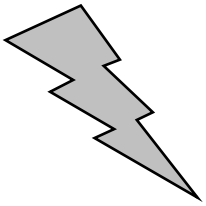
Row 20 strokes at each rate with 10 light strokes between each change. Rates increase by 2 strokes per minute.
E.g. 24 to 34, 26 to 36 etc

CONSOLIDATION

Continuous work for the time and rate given.

SPEED WORK

5 (5 x 20 strokes. 10 light between) rate 36.
Rate 36 - 500 strokes
Rate 36 - 400 strokes
Rate 40 - 300 strokes

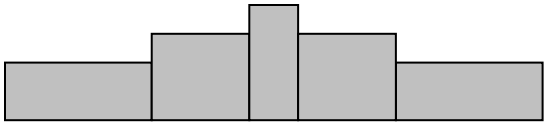


WORKOUTS

This section implements all of the preceding sections. For the most part each workout is outlined in terms of training effect, training load, and technical aim; these will be bolded for ease of understanding.

PYRAMID

Change rates at 3' 2' 1' 2' 3' 4' - 11' total.
Rates increase then decrease by 2 at each change.



		Minutes					Total
		3'	2'	1'	2'	3'	11'
PYR 24	5 sets at rates	20	22	24	22	20	55'
PYR 26	5 sets at rates	22	24	26	24	22	55'
PYR 28	4 sets at rates	24	26	28	26	24	44'
PYR 30	3 sets at rates	26	28	30	28	26	33'
PYR 32	3 sets at rates	28	30	32	30	28	33'
PYR 34	2 sets at rates	30	32	34	32	30	33'

When the above Pyramids are rowed continuously -each set piece with a five-minute period of light paddling between sets - ***training effect*** is improvement of aerobic capacity.

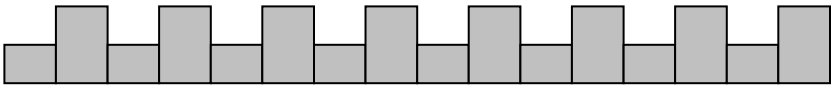
When these Pyramids are rowed intermittently -one minute light paddling between each rate change and a five minute rest period of light paddling between sets -***training effect*** is improvement of aerobic capacity and acclimatization of lactate in the body

All the above work is Normal ***training load***, but can be increased or reduced by 25%. Alterations should be made to times, making sure that the Pyramid principle is retained, but normally a different type of work would be done if it is necessary to amend the load for the best training effect.

Technical aim is to establish good technique at the lowest rate and to hold this quality as the rate increases. This method is a useful part of the system because longer pieces are rowed at the lower rates and the quality at the higher rates has to be held for a shorter space of time. It is equally important to hold quality when rates drop during the second half of a Pyramid.

When no suffix is shown, one only set is required.
A Half Pyramid refers to first half.

CASTLE



Method	Rates	Minutes Changes	Total
CAS 24 N	22 & 24	2’	66’
CAS 26 N	24 & 26	2’	44’
CAS 28 N	26 & 28	2’	36’
CAS 30 N	28 & 30	2’	26’

This work is continuous. If turns are necessary, they should be made within 30 seconds with work resuming as quickly as possible. ***Training effect*** is improvement of aerobic capacity.

Method	Rates	Minutes Changes	Total	Execution
CAS 32 N	30 + 32	2 '	24'	3 x 8'
CAS 34 N	32 + 34	1½	18'	3 x 6'
CAS 36 N	34 + 36	1¼’	15'	3 x 5'
CAS 38 N	36 + 38	1'	12'	3 x 4'

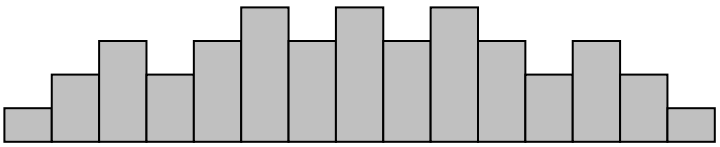
This work is intermittent with five minutes of light paddling between sets. ***Training effect*** is development of anaerobic capacity.

Training loads 'N' = Normal training load of approximately 80%
'H' = High training load of 100%, an increase of 25%
‘L’ = Low training load of 60% a decrease of 25%

Technical aim is to establish good quality at the higher rate making sure that the quality improves when more time is available at the lower rate.

Where the stretch of water does not permit more than eight minutes of continuous work the changes are reduced to 1½ minutes. Below five minutes the changes are reduced to intervals of one minute. The total time for the method remains.

PYRAMID CASTLE



1. PYR/CAS 28 L

The rates change every one-minute as follows:

22,24,26,24,26, 28,26,28,26,28, 26,24,26,24,22.
Continuous work for 15 minutes x two sets =total work 30 minutes.

The rate of striking (stroke rate) increases by two strokes at the end of each minute. At the end of the third minute the rate returns to the rate of the previous minute and starts the same process again until the maximum rate of 28 is reached. The method then follows a pattern of the same format returning to the original rate of 22.

'N' Normal ***training load*** is three sets x 15 min - total 45 minutes.
'H' High ***training load*** is four sets x 15 min - total 60 minutes.

2. PYR/CAS 30 N

The rates change every one minute as follows:

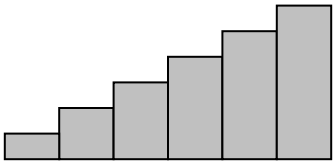
24, 26, 28, 26, 28, 30, 28, 30, 28, 30, 28, 26, 28, 26, 24
Continuous work for 15 minutes x two sets = total work 30 minutes. The format is exactly as for PYR/CAS 28 above.

'H' High ***training load*** is three sets x 15 minutes - total 45 minutes.
'L' Low ***training load*** is one set of 15 minutes.

Technical aim. This method is a valuable part of the System. If the oarsmen are unable to hold quality when rates increase the reduction of rate gives sufficient time for the quality to be re-established.

If the stretch of water allows thirty minutes of continuous work the changes should be increased to two minutes.
When no suffix is shown, one only set is required.

STAIRCASE



Method	Sets	Rates	Changes	Minutes Set	Total	Light
S/C 26 N	3	x 20:22:24:26:	4'	16'	45'	3'
S/C 28 N	3	x 20:22:24:26:28:	3'	15'	45'	3'
S/C 30 N	3	x 20:22:24:26:28:30:	2'	12'	36'	2'
S/C 32 N	3	x 22:24:26:28:30:32:	1½'	9'	27'	1½'
S/C 34 N	4	x 24:26:28:30:32:34:	1 '	6'	24'	1'
				Strokes		
S/C 36 N	8	x 26:28:30:32:34:36:	10	60	480	2'
S/C 38 N	7	x 28:30:32:34:36:38:	10	60	420	2'
S/C 40 N	6	x 30:32:34:36:38:40:	10	60	360	2'
S/C 42 N	5	x 32:34:36:38:40:42:	10	60	300	2'

All work is rowed continuously for each set with light paddling between sets.

The ***training effect*** of staircases below rate 32 are basically for improvement of aerobic endurance and above 32 the work is anaerobic.

Training load. When no suffix is shown on the schedule this indicates that only one set piece is required. If more than one Staircase is required, the Method Code will be preceded by the number e.g. 2 x 5/C 40. Staircases are seldom used for an entire workload; they are used to supplement others to make a useful session of complex work.

Technical aim is to establish quality at the lowest rates and to hold good form throughout the session. Technically this is one of the toughest exercises in the scheme.

LADDER

Row 20 strokes at each rate with 10 light strokes between each change. Rates increase by 2 strokes per minute.

Method	Rates	Strokes	Set	Total	Light
LAD 26 N	20: 22: 24: 26	80	24	1920	1’
LAD 28 N	20:22:24:26:28	100	16	1600	1’
LAD 30 N	20: 22: 24: 26: 28: 30	120	12	1440	1’
LAD 32 N	22: 24: 26: 28: 30: 32	120	9	1080	2’
LAD 34 N	24: 26: 28: 30: 32: 34	120	8	96O	2’
LAD 36 N	26: 28: 30: 32: 34: 36	120	7	840	2’
LAD 38 N	28: 30: 32: 34: 36:38	120	6	720	3’
LAD 40 N	30: 32: 34: 36: 38: 40	120	5	600	3
LAD 42 N	32: 34: 36: 38: 40: 42	120	4	480	3

Row 20 strokes at each of the above rates with 10 light strokes between. Light paddling for five minutes between each set.

Pulse rates should drop between 100 and 120 per minute during light paddle after each set before the next set is started. The recovery times are a guide and should be adapted to meet the required rest period for each crew.

The rate should be built up before the tenth stroke and the target rate held for the last ten strokes.

When no suffix is shown, one only set is required. When more than one set is required the Method code will be proceeded by the quantity.

The sets shown indicate the total work required for a Normal training load. It is not suggested that a LAD 26 N be done in its entirety for one session. LADDER work is a useful training method; it adds variety to a session and flexibility to the training loads.

Example: LADDER PROGRAM
LAD/PROG 40 N

22:24:26:28:30:32
24:26:28:30:32:34
26:28:30:32:34:36
28:30:32:34:36:38
30:32:34:36:38:40 600 strokes.

Row for twenty strokes at each of the above rates with 10 light strokes between.

CONSOLIDATION

Method	Rate	Minutes
CON 20N	20	120'
CON 22 N	22	80'
CON 24 N	24	60'
CON 26 N	26	40'
CON 28 N	28	30'
CON 30 N	30	24'

Training effect of the above work is improvement of aerobic endurance.

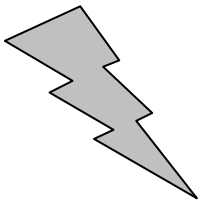
CON 32 N	32	20'	4 x 5” with 5’ light between.
CON 34 N	34	15'	5 x 3’ with 3’ light between.
CON 36 N	36	12'	6 x 2’ with 2’ light between.
CON 38 N	38	9'	6 x 1½’ with 1½’ light between.
CON 40 N	40	8'	8 x 1’ with 1’ light between.

Training effect of this work is improvement of anaerobic endurance.

All above work is at Normal ***training load*** of approximately 80%. Times should be increased or decreased by 25% for amendments.

Technical aim is to Consolidate equality at a specific rate. Good quality must be established early in the session and held throughout the period of tiredness, which gradually develops until it reaches its peak of exhaustion at the end of the work.

SPEED WORK



Method	Rates		
SPE 36 N	36	5 (5 x 20 strokes 10 light)	500 strokes
SPE 38 N	38	4 (5 x 20 strokes 10 light)	400 strokes
SPE 40 N	40	3 (5 x 20 strokes 10 light)	300 strokes

Build the rate up over 10 strokes and hold the target rate for the remaining ten strokes.

For 'H' high ***training load*** the rest period between strokes is reduced to 5 strokes light.
For 'L' low ***training load*** the rest period between strokes is increased to 20 strokes light.

Example: SPEED PROGRAM
SPEED/PROG N above race rate.

5 x	20	strokes	10	light	5' rest
5 x	20	strokes	5	light	5' rest
5 x	20	strokes	5	light	5' rest
5 x	20	strokes	10	light	5' rest
5 x	20	strokes	15	light	5' rest
5 x	20	strokes	20	light	600 strokes.

SPECIFIC WORK

Other types of work can be included in the system.
Examples would be:

I. Timed rows:
6 x 500m
4 x 1OOOm
3 x 15OOm
2 x 2OOOm

2. Racing starts and the change from high rate into race pace.

3. Fartlek - 600 strokes at free rates involving large increases and sudden changes.

4. Any work at natural rate of striking.

5. Practice courses e.g. Head races.
Sprints.

SUMMARY OF WORKOUTS

Methods			Loads								
PYR	26	N	76	mins	4 sets	x 19	mins				
	28	N	57	mins	3 sets	x 19	mins				
	30	N	38	mins	2 sets	x 19	mins				
	32	N	30	mins	2 sets	x 15	mins				
	34	N	22	mins	2 sets	x 11	mins				
	36	N	19	mins	1 set	x 19	mins				
	38	N	15	mins	1 set	x 15	mins				
CAS	24	N	66	mins	2 mm.	changes					
	26	N	44	mins	2 mm.	changes					
	28	N	36	mins	2 mm.	changes					
	30	N	26	mins	2 mm.	changes					
	32	N	24	mins	3 sets	x 8 mins					
	34	N	18	mins	3 sets	x 6 mins					
	36	N	15	mins	3 sets	x 5 mins					
	38	N	12	mins	3 sets	x 4 mins					
PYR/CAS	28	L	30	mins	2 sets	x 15 mins					
	30	N	30	mins	2 sets	x 15 mins					

								Changes.			
S/C	26	N	48	mins	3 sets	x 16	mins	4	mins		
	28	N	45	mins	3 sets	x 15	mins	3	mins		
	30	N	36	mins	3 sets	x 12	mins	2	mins		
	32	N	27	mins	3 sets	x 9	mins	1½	mins		
	34	N	24	mins	4 sets	x 6	mins	1	mins		
	36	N	480	str	8 sets	x 60	str	10	str		
	38	N	420	str	7 sets	x 60	str	10	str		
	40	N	360	str	6 sets	x 60	str	10	str		
	42	N	300	str	5 sets	x 60	str	10	str		
LAD	26	N	1920	str	24 sets	x 80	str.	4	x 20:10	light.	
	28	N	1600	str	16 sets	x1OO	str.	5	x 20:10	light.	
	30	N	1440	str	12 sets	x120	str.	6	x 20:10	light.	
	32	N	1080	str	9 sets	x120	str.	6	x 20:10	light.	
	34	N	960	str	8 sets	x120	str.	6	x 20:10	light.	
	36	N	840	str	7 sets	x120	str.	6	x 20:10	light.	
	38	N	720	str	6 sets	x120	str.	6	x 20:10	light.	
	40	N	600	str	5 sets	x12O	str.	6	x 20:10	light.	
	42	N	480	str	4 sets	x120	str.	6	x 20:10	light.	
CON	20	N	120	mins.							
	22	N	80	mins							
	24	N	60	mins							
	26	N	40	mins							
	28	N	30	mins							
	30	N	24	mins							
	32	N	20	mins	4 sets	x 5	mins				
	34	N	15	mins	5 sets	x 3	mins				
	36	N	12	mins	6 sets	x 2	mins				
	38	N	9	mins	6 sets	x 1½	mins				
	40	N	8	mins	8 sets	x 1	mins				
SPE	36	N	500	str	5 sets	x 100 str (5 x 20:10 light)					
	36	N	400	str	5 sets	x 100 str					
	40	N	300	str	5 sets	x 100 str					

EXERCISES

Exercises are a useful means of putting across a technical point to an oarsperson. There are many exercises that are used by coaches to emphasize a particular point or movement depending on the style the coach is teaching his/her oarsperson. The best exercises are an exaggeration of a particular movement the most useful of which are shown below.

In performing an exercise it is only of great use if it is carried out for long periods. At least 20 minutes of continuous work at one exercise is needed to achieve beneficial effect. Rowing Just 20 strokes is of little value. Sometimes a complete outing or a work program should be with square blades or from the 'strong point' position (defined in the following section) for most benefit from the exercise.

SHORT SLIDE ROWING

The benefit to be gained from this exercise is that:

I. The blades enter the water at a fast point in the stroke and have to move very quickly to achieve grip on the water. Because the stroke is short, the quickness has to be emphasized otherwise there is not a sufficient amount of the stroke to be effective. The sooner the blade grips the water the longer the stroke will be and the more it will achieve.

II. The shorter slide puts the legs in a stronger position for lively work. Muscles are stronger when they work through their middle range of movement of the limb. The oarsperson is able to spring his legs very quickly from a short slide position.

The object of the exercise is to achieve quick catches with the leg drive.

The exercise can be performed in various slide lengths. The most common phrases are 1/4 slide, 1/2 slide, and 3/4 slide.

The most valuable form of short slide rowing is called 'strong point' rowing. The rower sets himself/herself ready for the next stroke in a position which he/she feels is his/her strongest for a hard drive into the stroke. Normally this position is between 3/4 and full slide. As the rower learns to relax during his/her float forward and as he/she becomes more flexible, his/her length forward will gradually increase and he/she will become stronger in his/her forward position.

Rowing for 10 strokes in the 'strong point' position followed by 10 full length strokes is a very good exercise. It encourages a powerful stroke to which full length is then added, making the ultimate stroke - "long and powerful".

SQUARE BLADE PADDLING

Rowers are generally inclined to carry their blades **forward** too close to the water, particularly from extraction to the halfway point forward. They will be inclined to cut some corners when the rates climb and probably the first will be to reduce the circular movement at the extraction of the blade. If the oarsperson already has a small circular movement his next step may be to cut short the finish of his stroke. It is important that during the winter 'grooving in' period exact movements are carried out. Square blade paddling teaches an oarsperson the correct hand movement.

Rowing with a squared blade forces the oarsman to make full use of the small amount of room available over his thighs until his hands have cleared his knees. It also encourages a lively draw so that pressure is maintained on his blade. It is the pressure on the blade that helps a clean extraction.

Other benefits from Square Blade Paddling are that good balance is essential and the rower grows confident in his ability to balance the boat in adverse conditions, such as rough water and strong winds.

SAMPLE PROGRAM

PERIOD 2: 14 to 29 November.

TRAINING AIM:
Development of aerobic capacity with some strength improvement

TECHNICAL AIM:
To make full use of body weight at the finish, make sure that the body swings back while the blade is driving through the stroke, and do not let the body curl forward at the finish.

DAY	1	a.m.		CON 22 L
		p.m.		CAS 24 N
	2	a.m.	6	LAD 26
		p.m.		PYR 26 N
	3	a.m.		CON 24 L
		p.m.		CAS 26 H
	4	a.m.	4	LAD 28
		p .m.		PYR 28 N
	5	a.m.		S/C 26 L
		p.m.		PYR 30 N
	6	a.m.		S/C 30 L
		p.m.		LAD 30 N
	7	a.m.		Rest
		p.m.		Rest
	8	a.m.		CON 26 L
		p.m.		PYR/CAS 28 L
	9	a.m.		PYR 30 N
		p.m.		CAS 28 N
	10	a.m.	6	LAD 28
		p.m.		PYR 30 H
	11	a.m.		S/C 28
		p.m.		PYR/CAS 28 L
	12	a.m.		CAS 26 N
		p.m.		PYR 30 L
	13	a.m.		CON 28 N
		p.m.	2	S/C 30
	14	a.m.		Rest
		p.m.		Rest

TARGET RATE: 28

TIME KEEPING AND RATINGS CONTROL

A means of measuring the stroke rate and the timed pieces is essential. A stroke meter is the ideal instrument, but a normal stopwatch can be used successfully. Counting the number of strokes rowed for each minute or part of a minute can identify ratings. The easiest way is to count the strokes completed in 15 seconds, 30 seconds and then the full minute, for greater accuracy. For example:

8 strokes in 15 seconds = rate 32 (8 strokes x 4)
16 strokes in 30 seconds = rate 32 (16 strokes x 2)

When counting the strokes it is easier to count the number of 'catches' rowed. A stroke begins and finishes at the same place and nine catches are equal to eight strokes. Seventeen catches are equal to sixteen strokes, and thirty three catches are equal to thirty two strokes per minute.

ROWING TECHNIQUE

STING AND FLOAT

Good rowing technique is a combination of POWER (muscular coordination) and BLADE control. A boat will only travel as fast as the blades drive it!

In a 2000 meter race an Oarsperson rows between 200 and 250 strokes in his bid for a medal. This is a small number compared with the many thousands rowed in a training period. Concentration of effort per stroke is obvious and it is one of the hardest things to achieve in the sport.

A stroke can be divided into two phases:
1. The Power phase.
2. The Recovery phase.

This System sets out to train rowers to apply full power to each stroke and to take a good rest between strokes, which will enable them to apply a high load for a long time.

The phrase 'Sting and Float' identifies the Power as the 'sting' and the recovery as the 'float'.

Good technique is based on the coordinated strength of the oarsperson, which provides the power, and control of the blade to transmit that power into efficient propulsion of the boat.

The correct path for a blade, the sequence of movements, which coordinate muscular strength into power and the recovery phase, which helps the body to maintain full power for 200 strokes, is illustrated on the following pages.

BLADEWORK

The most efficient path for the blade is described as follows:

The blade should:
- Enter the water quickly in the most acute angle to achieve full use of the reach forward.
- Move quickly into the horizontal plane once it is covered.
- Accelerate from entry, through the middle of the stroke to the finish where it reaches maximum thrust
- Remain at the same even depth throughout the stroke, well covered but with the shaft clear of the water
- Leave the water quickly and cleanly at the end of the stroke and turn onto the feather only when it is clear of the surface.
- Travel forwards well clear of the water after extraction, at an even height until it comes down to the surface squared and ready for the next stroke.

It is important to avoid the following common **TECHNICAL ERRORS** for the reasons given:

1. BLADE MISSING THE FIRST PART OF THE STROKE.
   The angle and speed of entry is critical. Length of stroke is lost and valuable leg drive is used inefficiently until the blade is covered.

2. BLADE TRAVELS TOO DEEP IN THE MIDDLE OF THE STROKE.
   The direction in which the blade travels through the stroke is important. It must relate to the direction of the boat. A blade moving in an angle, which takes it deep into the water at the midway point, is inefficient: the blade achieves less grip, some of the propulsive force is misdirected, and resistance to the oarsperson is

caused by the shaft breaking through the water. These are the main areas of inefficiency, but other problems created by a deep blade are height of draw, balance, rhythm and inconsistency.

3. RAGGED EXTRACTION
   The blade must be extracted cleanly at the finish of the stroke at the moment full power is released. A blade that drags out of the water impedes the smooth flow of a fast moving boat.

4. BLADES NOT CLEARING THE SURFACE DURING THE RECOVERY.
   The blade must be carried forward well clear of the water to avoid contact with the surface, a wave or another puddle. If the blade is carried too close it is necessary to lift the blade higher when it is to be squared for the next stroke. This movement Just before blade entry inhibits the preparation for a good catch. It also leads to the blade missing the first part of the stroke as described before. A blade carried too close to the water restricts the free flow of the boat and the crew finds difficulty in keeping the boat on a level keel.

Correction of these errors is part of learning good technique. Understand what good bladework is, make sure the rowers are quite relaxed, and encourage them to look at their own bladework during technical sessions and inform them that practice makes perfect and mileage makes champions.

POWER

In the same way that oarsmen must apply their power together, the oarsmen must work their muscles in support of each other. The correct movements of the body to achieve this coordination of strength are described as follows:

1. The hands guide the blade into the water.

2. The legs provide the speed which gives the blade early grip on the water.

3. The muscles of the back, shoulders and arms hold firm and provide strong connection between legs and blade.

4. The legs provide the main source of the power and maintain firm pressure throughout the stroke. Soon after blade entry, the trunk begins to swing back and the shoulders send the seat forward, drawing the oar so that through the middle of the stroke all muscle groups are working together.

5. The trunk continues to swing back till the time the arms are pulling so that pressure is maintained on the blade whilst the boat is increasing its speed.

6. The oarsperson sits tall as his/her hands draw high into his/her chest at about the height of his second rib. He/she makes sure that his/her hands do not hit his/her body at the finish of the stroke.

7. His/her hands move quickly and smoothly down and away from his/her body following the line of his thighs. The inside hand turns the blade onto the feather immediately after it is clear of the water.

8. When the arms are relaxed and straight and hands clear the knees the trunk swings forward before the slide leaves backstops. The body angle is held all the way forward to the front stops in readiness for the next stroke.

9. The seat leaves backstops slowly and unhurriedly, but without wasting any time. The sliding forwards is in sympathy with the motion of the boat and it is during this phase that the rower rests and prepares himself/herself for the next stroke.

10. His/her legs begin to rise as the seat approaches front stops. He/she remains sitting tall in the boat and floats up over his/her knees ready for a long reach forward. He/she is quite relaxed, letting the speed of the boat running beneath him/her draw his/her seat forward to front stops.

    The style is based on a powerful drive from the legs with other muscle groups working in support. Every available muscle is used to drive the blade. Immediately the blade is released from the water the rower relaxes. This allows his/her body to achieve some recovery. It is this recovery which enables the rower to apply full power to 250 strokes or the number of strokes it takes to row 2000 meters.

It is Important that the following common **POWER ERRORS** are avoided for the reasons given:

1. **SITTING TOO LONG AT BACK STOPS POSITION.**
   The sooner the sliding seat leaves backstops the slower it needs to travel. At the rate of thirty, the time available for sliding forward with a good rhythm would be under 1+ seconds. Clearly, time spent sitting too long at backstops has to be made up to avoid the rate dropping, and the rower ends up sliding faster forward.

   The momentum generated from the power of the stroke should be channeled into a smooth and lively recovery of the hands leading the body forward and the seat from back stops without wasting time.

2. **SLIDING TOO FAST FORWARD**
   The speed of the sliding forward should not exceed the speed during the stroke. Sliding too fast forward does not allow the rower to rest fully. There are other disadvantages in that it does not permit smooth running of the boat, the rower loses feel for the boat and he/she is hurried into the forward position from which he/she is unable to time his/her next stroke. Falling or pitching over the knees at front stops stems from sliding too fast forward.

3. **STRETCHING FOR MORE LENGTH FROM FRONT STOPS POSITION.**
   The length of stroke, determined by the angle of the body in the forward position, originates from the swing forward of the trunk from backstops. Attempting to reach for more length once the slide has left backstops often has the opposite affect. Diving forward for more length can cause the body to fall onto the thighs and actually prevent good length forward.

   Stretching for more length, putting strain on the arms and back, at a time when the body should be set ready to spring onto the stroke, not only prevents a good beginning but it puts strain on the back which sometimes cannot hold firm. This leads to slide shooting which is a common fault!

   Another common fault, which is linked to stretching for length, is the hands dropping which lifts the blade too high off the water. This inevitably means that the first part of the stroke is missed.

4. **SHOOTING THE SLIDE.**
   When the legs drive at a faster pace than the hands move, it is evident that the back muscles have not held firm and some of the leg power is wasted. There is also the risk of injury to the back muscles. Stretching for more length forward is a common cause of slide shooting. It is important that the trunk holds firm as the legs drive the blade into the water.

5. **OPENING THE TRUNK AT THE BEGINNING OF THE STROKE.**
   Young people and sometimes newcomers to the sport are often weak in the lower back and have difficulty in holding the trunk firm against the power of their legs. In these circumstances it is advisable to teach the technique of opening the body before driving the legs. This places the back in a stronger position and more able to hold firm. As development of the back muscles takes effect, gradual change in the technique should be introduced. It is very difficult to achieve a good catch in a fast moving boat without full use of the legs.

6. **BODY CURLING FORWARDS AT THE FINISH OF THE STROKE.**
   This fault occurs when pressure is reduced on the blade during the last part of the stroke. With no support, the body curls forwards. This reduced blade pressure is caused by either of the following faults:

   I. Using the arms at the beginning leaves the rower less arm strength with which to draw the finish. This also eliminates the powerful latissimus dorsi and reduces the effect of the deltoids (shoulders), gluteals and erector spinae muscles.

   II. When the back does not hold firm against the leg drive, the legs reach backstops ahead of the stroke in the water. The arms are unable to cope with this amount of work left to do and pressure on the blade is reduced.

III. Opening the body at the beginning of the stroke which delays the leg drive and reduces the effect of the legs so that co-ordination of the muscle groups is less efficient. The weakness shows at the most vulnerable part of the stroke, i.e. the finish.

The oarsperson sits tall in the boat as he/she swings back at the finish, applying full body weight to the blade. This swing back supports the draw with the arms, and pressure is maintained on the blade of an accelerating boat. It is with this pressure that the body recovers itself for the next stroke.

7. **UNCONTROLLED SLIDE FORWARD AND POOR PREPARATION OF THE BODY.**
The hands extract the blade from the water in the lively flowing movement leading the body into an inclined forward position and the seat into motion, sliding to front stops. The rower relaxes during this recovery phase to help the body achieve some rest and to prepare for the next stroke.

It is a common fault to move the seat off backstops with the arms still bent and the body not fully inclined forward. The effect of this is:

I. The hands are carried too high so that they can clear the knees as they rise. The blade is carried too close to the water, which also impedes the balance of the boat.

II. The body swinging forwards as the slide approaches front stops will fall onto the thighs and prevent a good forward reach.

III. The last minute reach forward prevents the rower from preparing well for the next stroke.

IV. The oarsperson is less able to relax and have sufficient rest. Tension will be likely in his hands and shoulders.

V. The stern of the boat will drop rapidly just before the catch as the oarsperson pitches forward from front stops.

VI. The body will be in a weaker position for the next stroke.

CORRECTION OF FAULTS

Understand what a fault is and accept that it exists.
Identify the cause of the fault.
Understand what good technique is and practice it.
Practice makes perfect.

SCULLING TECHNIQUE

Three factors determine the speed of the boat. They are:
1. Power - how fast the boat travels each stroke.
2. Length - how far the boat travels each stroke
3. Rate - how many strokes are rowed.

If a crew rowed at maximum capacity in all three of these components at the same time, it is doubtful that crew could row 10 strokes before technique withered and boat speed faded. The number of strokes required to complete 2000 meters is about 250 and clearly, an equilibrium of power, length and rate must be achieved. Rowing is basically a power endurance sport, but it requires a high level of skill. Choosing the "***right"*** technique and then teaching it is a coaching skill and there are many differing opinions about which method is the best. Whatever the method, power, length and rate are the basic ingredients.

RATE

Rate is the easiest to achieve. Keeping it at its optimum in a race is not the main problem. Length and power are the first to deteriorate when the pressure of the race reaches its peak.

LENGTH

The most efficient part of the stroke is when the blade is passing at 90 degrees to the boat. Only when it is at this angle is its force propelling the boat wholly in the correct direction. In theory, an efficient length of stroke is from 45 degrees at the catch to 135 degrees at the finish. In practice, the body prevents the arms from reaching more than 125 degrees. To achieve 45 degrees at the catch, the reach must extend beyond this angle. A longer finish can be drawn in a sculling boat but it is inefficient to draw more than 130 degrees.

POWER

Maximal power is achieved by appropriate sequencing of the contributing muscles from strongest to weakest.

- Legs first. The quadriceps and gluteals
- Then the Back. The lower back.
- Then the Shoulders and Arms. The latissimus dorsi, trapezius, rhomboids and biceps.

THE STROKE

The boat goes only as fast as the blades drive it. The power transferred through the blade to the boat is only as much as the legs supply. A good technique is based on the work of the legs to create most of the total power.

THE CATCH

The faster the blade enters the water the more positive will be the grip, the longer will be the stroke and the faster the boat will travel. The important points are:
1. Hands guide the blade into the water.
2. Legs apply the power
3. Trunk and arms link legs to blade

MIDDLE OF THE STROKE

All the muscles are working through their middle range and the blade is at its most efficient point in the stroke. Make full use of this advantage by beginning the draw with the arms before midway. The arms must start to draw well before the legs reach the backstops.

THE FINISH

Retain pressure on the blade through to the finish by pressing toes on the footboard, by using the leverage of the trunk, and by keeping the arms working with the body. Although legs reach backstops before the arms and trunk have finished working, the toes should continue pressing hard to give support with the back until the blade is extracted. The trunk should be moving towards the bow until the moment before the hands reach the body (if the arm draw starts too late, this timing will be delayed).

RHYTHM

The rowing stroke comprises fast movements and slow movements. The essence of good rhythm in the boat is the contrast between them. Done well, a good motion looks smooth, continuous, and unhurried but it can be difficult to see that contrast. The *fast* movements begin with the entry of the blade and continue through the stroke and the movement of the hands away from the body after blade extraction (the finish). The slower movements begin when the hands pass over the knees and continue until the next stroke. The inertia created by the power of the stroke carries the hands down and away from the body when the seat is at the backstops. The body relaxes immediately as the blade leaves the water so there is no interference with this natural free-flowing movement. The seat moves *slowly* forward in contrast to its speed during the stroke. The rower prepares by gathering, ready to spring from the stretcher onto the next stroke. The movement of the seat must be faster during the stroke than it is during the recovery. The sooner it leaves the backstops after the finish, the more time it has to reach the front stops and the slower it can travel. The hands and then the body move lively away from the finish to allow the seat to start on its way forward.

THE RECO VERY

Hands, Body, Slide...

1. Move the hands down and away over the knees
2. Pivot the body forward onto the feet
3. Move the seat away from the backstops.
4. Move forward, rest the body and let the boat run underneath you.

PREPARE FOR THE STROKE

To achieve optimum position for the application of power and good forward length - note the following points of posture:

1. Head high encourages good posture for body and spine
2. Chest against thighs. Rotation should be centered around the hip joint, not the upper or lower back
3. Shins vertical - strong position for the quadriceps
4. Relaxed but alert - poised like a cat ready to spring

SCULLING

The oar handles should be held in the fingers, not the palms. The hands should generally be at the tips of the oars to maximize inboard leverage, with the thumbs pressed against the handle nub to generate sufficient outward pressure against the oarlock. As someone said, "The handles should be grasped like one is holding a small bird: firmly enough to hold on, but not so hard as to kill it." The grip of the fingers around the oar will automatically increase sufficiently when contact with the water is made The arms and hands should extend along a horizontal plane out well over the gunwales as the blade angle is increased in preparation for grasping the water. The entry of the blade into the water will be accomplished with a relaxation or slightly positive "flick" of the hands and arms while maintaining the blade angle (not opening the back) to achieve the catch.

RELAXATION

Contract only those muscles needed to perform a specific function. This is achieved by relaxation of the hands, arms and shoulders, the areas where tension will be most prevalent. The muscles of the upper body will be more effective if they begin the catch in a relaxed condition. Muscles will contract instantly when a load is forced upon them.

BLADEWORK

The importance of bladework must be appreciated. Only the blades move the boat, therefore an important part of the technique is the skill with which the blades are controlled.

Good blades have these characteristics:

1. A long stroke in the water I Minimum loss of reach forward/Quickly grip the water I Covered throughout the stroke.
2. Utilize power/Grip the water with minimum loss of leg drive/Work in a horizontal plane/Covered throughout the stroke.
3. Do not interfere with the run of the boat/Clean extraction/Carried forward clear of the water/Balance the boat.

RHYTHM - WHERE TO POISE

It is always necessary to compose before any dynamic action (e.g. Lifting a weight, striking a note, hitting a ball, or rowing a stroke). The question is "where is the best place to "poise" prior to the action? There are different ideas in rowing on where the poise should be.

The current method is to poise during the last part of the movement towards the front stops. The inertia created by the draw at the finish is used to carry the hands away from the body, the trunk into the catch angle and the seat from backstops. The rower has time to relax, let the boat run under the seat, and to prepare for the next stroke. The poise just before blade entry is sufficient to achieve a very fast catch.

SCULLING STYLE

Sculling styles differ in where emphasis is p laced. Body positions and movements will be influenced by this emphasis. The method should be based on rhythm. The stroke is divided into two phases:

1. The Stroke or power phase, and
2. The Recovery or resting phase.

Scullers are trained to apply full power to each stroke and to rest during recovery, which will help them apply power to 250 strokes or the number required to complete the race.

The ability to apply power is an essential physical requirement. Physical capacity is acquired by training but the coordination of muscular contraction in the rowing stroke is the essence of good technique.

The System of Training Intensity Categories

National Team

Intensity Category	Approx. Heart Rate Range	Duration One Piece (min)	RATIO Work : Recovery	Goals of the Training Intensity	Practical Examples (SR = stroke rate)	Lactate Level (mmol/ L)
1	180-200	0.5-1.5	1:4 - 1:5	• Anaerobic Capacity • Transportation = Development of Cardiopulmonary System • Ability + feeling of Start/Spurt • Aggression	1 - 6 x 500m (with start) Interval training (short pieces) Serie of 30-60 strokes or: Series of 1-2 min SR: > Race Pace	>10
2	180-200	2-7	1:2 - 1:3	• Race Endurance • Transportation = Development of Cardiopulmonary System • Race Speed Feeling • Race Attitude/Plan	Race over 1500 - 2000 m 6 x 2 min 3 x 1000 m 5 x 750 m SR: Race Pace	8-14
3	180-200	6-10	2:1 - 1:2	• Development of Aerobic Capacity • Strength Endurance • Tactics • Technique	4 x 7 min 3 x 2000 m constant speed 5 x 5 min strength endurance water SR: 2-4 less than Race Pace	5-8
4	165-175	10-45	4:1	**ANAEROBIC THRESHOLD** • Development of Aerobic Capacity • Efficiency • Strength Endurance	2 x 20 min with SR changes 3 x 5 km time-control 10 km head race 3 x 12 min strength endurance water SR: 3-6 less than Race Pace	~4
5	150-165	30-90	-	• Basic Endurance • Utilization of Aerobic Capacity • Maintenance • Technique	30 - 90 min steady state SR: 10-12 less than Race Pace	~3
6	135-150	>45	-	• Utilization of Aerobic Capacity • Regeneration • Maintenance • Technique	45-120 min steady state at low intensity SR: 18-24 / min	<2

(from V. Nolte, A. Morrow, B Richardson, A. Roaf)

Club Level Rowing

Intensity Category	Approx. Heart Rate Range	Duration One Piece (min)	RATIO Work : Recovery	Goals of the Training Intensity	Practical Examples (SR = stroke rate)
1	180-200	0.5-1.5	1:4 - 1:5	• Anaerobic Capacity • Transportation = Development of Cardiopulmonary System • Ability + feeling of Start/Spurt • Aggression	1 - 6 x 500m (with start) 30/40/50/60/50/40/30 on separated by 30 off 5 x 2 min on with 1 min off SR: > Race Pace
2	180-200	2-7	1:2 - 1:3	• Race Endurance • Transportation = Development of Cardiopulmonary System • Race Speed Feeling • Race Attitude/Plan	Race over 1500 - 2000 m 6 x 2 min 3 x 1000 m 5 x 750 m SR: Race Pace
4	165-175	10-45	4:1	**ANAEROBIC THRESHOLD** • Development of Aerobic Capacity • Efficiency • Strength Endurance	2 x 20 min with SR changes 3 x 5 km time-control 10 km head race 3 x 12 min strength endurance water SR: 3-6 less than Race Pace
5	150-165	30-90	-	• Basic Endurance • Utilization of Aerobic Capacity • Maintenance • Technique	30 - 90 min steady state SR: 10-12 less than Race Pace
6	135-150	>45	-	• Utilization of Aerobic Capacity • Regeneration • Maintenance • Technique	45-120 min steady state at low intensity SR: 18-24 / min

(from V. Nolte, A. Morrow, B Richardson, A. Roaf)

The System of Training Intensity Categories

High School Level Rowing

Intensity Category	Approx. Heart Rate Range	Duration One Piece (min)	RATIO Work : Recovery	Goals of the Training Intensity	Practical Examples (SR = stroke rate)
2	180-200	2-7	1:2 - 1:3	• Race Endurance • Transportation = Development of Cardiopulmonary System • Race Speed Feeling • Race Attitude/Plan	1 race over 1500 - 2000 m 6 x 2 min on, 2 min off 3 x 1000 m Race Pace 4 x 500 m with 2 min rest 30/40/50/60/50/40/30 Power strokes on separated by 30 strokes off SR: Race Pace & Higher
4	165-175	10-45	4:1	**ANAEROBIC THRESHOLD** • Development of Aerobic Capacity • Efficiency • Strength Endurance	20 min/15min/10 min on 4 min off 2 x 20 min with SR changes 3 x 5 km time-control 10 km head race 3 x 12 min strength endurance water SR: 3-6 less than Race Pace
5	150-165	30-90	-	• Basic Endurance • Utilization of Aerobic Capacity • Maintenance • Technique	30 - 90 min steady state SR: 10-12 less than Race Pace 4 x 10 min Power Strokes with SR = 15-18 (rest: 1-2 min)

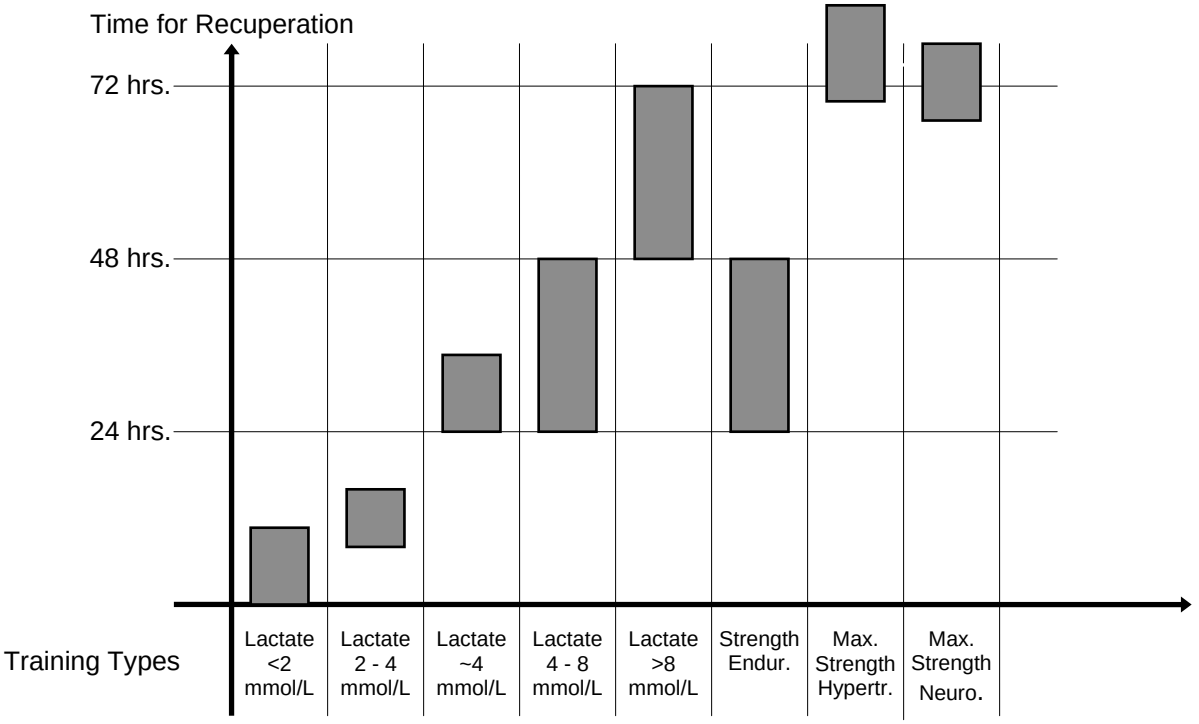
(from V. Nolte, A. Morrow, B Richardson, A. Roaf

Length of Recuperation After Different Types of Training

Training Types Process of Recuperation	Aerobic Training (Categories 4 to 6)	Combined Aerobic / Anaerobic Training (Category 3)	Anaerobic Training (Categories 1 & 2)	Strength Training	Neuromuscular (Speed) Training
Continuous Recuperation	Possible after 60-70% intensity (Cat. 6)	Not possible	Not possible	Not possible	Possible after very short sets (~15 sec) and long rest
Immediate (But only Partial) Recuperation		After approx. 1.5-2 Hrs.	After approx. 2 Hrs.	After approx. 2-3 Hrs.	
90-95% Recuperation (Incomplete)	~12 Hrs. After 70-90% intensity (Cat. 5 & 6)	After approx. 12 Hrs.	After approx. 12-48 Hrs.	After approx. 18 Hrs.	After approx. 18 Hrs.
Complete Recuperation (Increased Fitness)	~24-36 Hrs. After 70-90% Intensity (Cat. 5 & 6)	After 24-48 Hrs.	After 48-72 Hrs.	After 72-84 Hrs.	After ~72 Hrs.

according to: Keul/Kindermann/Martin; using the CATEGORIES OF INTENSITY

RECUPERATION FROM PREVIOUS TRAINING



Preparing for the Main Competition		
Phase	Days	Major Focus
1.	10-20	• General Endurance • Athletic Ability • Aerobic Rowing Endurance
2.	8-12	• Specific Strength Endurance • Rowing Endurance
3.	6-10	• Rowing Specific Endurance/Races • Tactics
4.	6-10	• Recuperation • Preparing the Main Competition(s)
5.	4-7	• Races • Recuperation

The Coxswains Drill Card

Drills \ Problems	Balance at the catch	Balance at the finish	Balance on the recovery	Balance on the drive	Set rocks	Poor blade height	Late/early catch	Sky/hang at catch	Roll up problems	Slow initial drive	Weak finish	Late/early finish	Wash at finish	Slow hands away	Rush	Rate Too High	Stroke length off	Lean problem
Catch placement	👍		☺	😐	👍		👍	👍	👍						👍		👍	👍
Catch sequence	👍		☺	😐			👍	👍	☺	👍					👍		👍	👍
Circular rowing	☺	😐	👍		☺	👍	☺	☺							☺			
Cut the cake		👍	👍		👍	👍	☺							👍	☺	👍	👍	
Drag & glide										👍	👍	☺						
Exagg. layback		☺									☺	👍	☺	👍	😐	😐	👍	👍
Exagg. slowness	👍		👍		👍	☺	👍		👍						👍	👍	😐	👍
Eyes closed	😐	😐	😐	😐	😐	😐	👍	👍				👍		😐	👍			😐
Feet untied		☺									😐	☺	👍				👍	☺
Finish sequence		👍	👍		👍	👍					😐	😐		👍	😐			
Five stroke alt.	☺		👍	☺	👍	☺	👍			☺					☺	👍	😐	
Freefall drill			👍		👍		👍	☺		👍	☺			👍	👍	👍	👍	
Gunwale high	☺	☺	👍		👍	👍		👍					👍					
Inside hand only	☺	😐	👍		😐	😐	😐	😐	👍				👍				👍	☺
No blade height	👍	👍	👍		👍	👍		👍					👍					
Outside hand only	👍	☺	👍	👍	☺	👍	😐	👍	😐		☺		👍				😐	☺
Pairs joining in							👍	😐		👍	👍	👍		☺	☺			
Pause drill	☺	👍	👍	☺	👍	👍	👍		☺			👍		👍	👍	👍		
Pause every catch	👍			👍			👍	👍	👍						👍	👍	👍	👍
Pick drill	👍	☺	👍	☺	👍	👍	👍	😐	👍			😐		👍	👍	👍	😐	👍
Reduce feather	👍	👍	👍		👍	👍		👍	👍				👍					
Row in air				👍						😐				☺			😐	
Russian drill	👍	👍	👍	👍	👍	☺	👍	👍		👍	👍	👍	👍	👍				
Scull it up							👍	👍		👍	👍	👍	😐	👍				
Square blades	👍	👍	👍	😐	👍	👍	😐	👍		😐			👍					
Start. finish drill		👍	👍		👍	👍							👍	👍	👍	😐		😐
Straight arms		👍		☺							👍		😐	👍			😐	
Wide grip	😐	😐															👍	👍
0 to 50% pressure		👍		👍							👍	👍	👍	👍		😐		
1, 2, 3 set	👍	👍	👍	👍	👍													
1, 2, 3 rowing	😐	😐	👍		👍	👍	👍								😐	😐		😐

👍 **= Very Useful** ☺ **= Useful** 😐 **= Somewhat Useful**

Mini-definitions of selected drills

Catch placement	From various places on the recovery, place the blade into the water.
Catch sequence	Row on the square or feather at first six inches, legs only, legs+arms, legs+ back, and then regular rowing.
Circular rowing	Tap gunwales on the recovery after the oar handle passes the knees
Cut the cake	At hands away, body angle, or 1/4 slide, pull the hands back to the body.
Drag & glide	A pair drags their blades for ten strokes and then gunwales for 10.
Finish sequence	The pick drill with a pause at every 1/4 slide
Five stroke alternation	(pick drill in reverse) Every five strokes reduce the stroke length
Freefall drill	Alternate 1/4 slide and full slide strokes.
Pair joining in	Join in pairs until all 8 are rowing. Alternate the starting pair.
Pick drill	Row at quick pick, swing pick, 1/4 slide, 1/2 slide, 3/4 slide, then full slide.
Russian drill	Row all 8 at 1/4 slide with full pressure and a high stroke rate for 10 strokes. A four then gunwales the blades for 10 strokes. After rowing all 8 for 10 strokes, the other four gunwales the the blades for 10 more strokes. Repeat at swing pick, quick pick, swing pick, 1/4 slide, 1/2 slide, 3/4 slide, and then full slide.
Scull it up	Reduce to 1/4 slide full pressure + increase the stroke rate as high as possible.