

Specific Fitness Training

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1.0 INTRODUCTION

The FISA CDP booklet titled GENERAL FITNESS TRAINING defined fitness as the successful adaptation to the mental and physical stress encountered in life. General fitness training was defined as a scientifically based and systematic training programme to provide the athlete with the basic means to adapt to the training loads encountered through controlled exercise.

The booklet emphasized the establishment of a broad base of general physical development as a prerequisite for specialization in the sport of rowing. As in many sports, specialized training is necessary given the high level of competition in sport today. This applies to all aspects of training and results in the amount of specialized training being progressively and constantly increased both during the season and from season to season.

Therefore, specific fitness training may be defined as a scientifically based and systematic training programme to provide the athlete with the means to adapt to the specific requirements of a sport.

2.0 GENERAL PREPARATION FOR ROWING

The general preparation for rowing requires a broad base of physical development. The base is established during the early years of athletic training and emphasized during the preparation period of each training season.

Specific preparation for rowing requires a training programme that emphasizes the physical, technical and psychological needs of the sport. This requirement is important during the latter part of the preparation period and during the competition period of the training season, and increasingly important throughout the athlete's career.

It should be noted that it is important not to increase disproportionately the amount of specific training at the expense of general physical development.

Therefore, the main features of general fitness training must be emphasized:

1. Mobility training enhances the learning of good technique, decreases the risk of injury and provides an opportunity for better development of strength and endurance; this type of training should commence early and continue throughout the athlete's career.

2. Strength is a basic physical characteristic that determines performance efficiency in sport; improvements in strength specific to rowing is dependent on the proper establishment of a base through using general conditioning exercises, particularly during the basic training stage of athletic development and the general preparatory period of the training season.

3. Endurance is the capacity of the athlete to resist fatigue during applications of work; as a medium term endurance event, rowing requires the specific development of both aerobic and anaerobic capabilities; but, as the aerobic energy system accounts for about 75-80% of the required energy for the rowing race and takes a longer period to be established and maintained, aerobic endurance training must be emphasized throughout the athlete's career.

3.0 SPECIFIC PREPARATION FOR ROWING

In designing a specific training programme for rowing, it is necessary to consider the three components of training: physical activities, technical skills, and psychological factors and tactical skills. This concept is introduced and explained in the booklet titled INTERMEDIATE TRAINING METHODOLOGY.

A programme for developing the psychological factors and tactical skills will be presented in Level III of the FISA CDP while a programme for developing technical skills is presented in the booklet titled INTERMEDIATE ROWING TECHNIQUE.

This booklet will provide more information about the specific physical activities necessary to enhance performance in rowing.

4.0 SPECIFIC PHYSICAL TRAINING

This section will present this topic by examining the main features of fitness training introduced in GENERAL FITNESS TRAINING, namely:

1. mobility training,
2. strength training, and,
3. endurance training.

But, it is first necessary to expand upon the basic principles of training discussed in BASIC TRAINING METHODOLOGY.

4.1 Principles of Training

The important principles of training are:

1. Progressiveness of training: the training load must be progressively increased to obtain further improvements in physical performance as the athlete adapts to the quantity and quality of the work.
2. Specificity of training: the adaptation by a physical performance factor of an individual is specific to the type, quantity and quality of the training load.
3. Reversibility of training: the adaptation to a training load will decline when the training load is stopped or even lessened; the longer the adaptation period, the slower the decline and vice versa.
4. Rest: this principle has been called the most important principle of training because a period of reduced training or complete rest will allow the body to adapt and overcompensate for the applied training load.

4.2 Mobility Training

It is only necessary to refer to the comments written above and in section 4.0 of GENERAL FITNESS TRAINING for this topic. Remember, mobility training provides a base for all physical activity and is important for the optimum application of force throughout the range of movement used in the rowing stroke. Reference should be made to either Appendix A in GENERAL FITNESS TRAINING or one of the numerous texts that are available for mobility exercises.

4.3 Strength Training

Although specialization is a complex process, special exercises may be divided into two groups:

1. The first group comprises exercises that are similar to the sequence of the body movements in the sport (for example, utilization of the rowing ergometer or on the water technical exercises); and,
2. The second group comprises exercises that represent partial movements of the whole sequence of movement (for example, utilization of a strength training programme). This group has exercises that activates single or multiple muscle groups in a way similar to the body movements in the sport.

As the athlete matures and become more experienced, the special exercises become more specific to the sport and are performed against the increasing resistance offered by the use of equipment (for example, barbells). This will result in the greatest development of strength relevant to the sport.

A strength training programme should commence with a general conditioning programme followed by a programme of gradually increasing training loads. This progression was demonstrated through the use of circuit training and with reference to Strength Training Guidelines (see figure 2 and Appendixes B and C in GENERAL FITNESS TRAINING).

The Strength Training Guidelines may be expanded to include the following relationship between repetitions and percentage of maximum load for one repetition:

Type:	1	2	3	4
Purpose:	General Conditionings	Strength Endurance	Power	Maximum Strength
Repetitions:	30-40	20-25	10-12	4-6
% of Max	40-55	60-65	70-75	80-90

Remember, young or beginning athletes should not attempt to develop maximum strength either during maturation or the first year of training. It is recommended that young athletes emphasis exercises that utilize their own body weight, working with a partner or simple equipment (see Appendix C in GENERAL FITNESS TRAINING).

During the latter stages of maturation, the young athlete should be taught proper barbell lifting techniques in conjunction with a more structured training programme. These types of exercises (that establish and maintain a preparation base) and the proper teaching of barbell lifting techniques should be continued throughout the athlete's career.

Before maturation or during the first training year of older athletes, the athlete should follow a programme of increasing loads by utilizing sets of 10-25 repetitions at 60-75% of maximum.

This level of training is used to develop an anaerobic base that will translate into greater work capacity in ensuing years. It also offers advantages of muscle growth and markedly reduced risk of injury.

Athletes should only progress to 80% of maximum or higher after one solid year of training. It should be noted that it is not necessary for beginners or even experienced athletes to test for maximum load capability for one repetition. This should only be

attempted by experienced athletes with a high degree of skill. If the programme designates the performance of 20-25 repetitions and the athlete is not able to perform 20 repetitions then the load is too heavy. If the athlete is able to perform 25 or more repetitions, it is necessary to increase the weight. This simple trial and error process will enable the determination of the proper load.

It is generally accepted that during the first stages of training twice weekly sessions (but not on back-to-back days) is enough to stimulate gains. Further, each session during the first weeks of training should be comprised of 1-2 sets. This will also demonstrate ample performance improvement.

An increase in the number of sets should occur when the athlete has adapted to the training load and is maintaining the required skill level. These increases should be gradual and with no attempt to try big progressions.

More training sessions will be needed when the athlete encounters the law of diminishing return from the number of weekly training sessions. In rowing, it has been demonstrated that three training sessions per week are practical and will result in sufficient gains to benefit the athlete.

Generally, as the season progresses and the athlete develops from season to season, the number of exercises will decrease. This is a result of the athlete becoming more specific in training for the sport.

At the end of this booklet, Appendix A has been presented to assist you in organizing your strength training programme for the training year. Further, Appendix D has been presented to provide an example of a strength training programme which emphasizes the use of barbells for strength training.

It is recommended that an experienced coach of strength training, particularly of lifting techniques, be consulted to provide further guidance for the design, instruction and supervision of strength training programmes.

4.4 Endurance Training

This booklet will provide further information on this topic by providing Appendices B on Guideline for the Periodization of Endurance Training and Appendix C on Endurance Training Methods for Rowing. The latter appendix is an expansion of Appendix D in GENERAL FITNESS TRAINING.

5.0 SUMMARY

The information presented in this booklet expands on the presentation in GENERAL FITNESS TRAINING and will assist you, the coach, in a better understanding of and ability to prepare training programmes for your athletes.

6.0 APPENDICES

6.1 Appendix A - Guideline for the Periodization of Strength Training

Type:	I	II	III	IV
Purpose:	General Conditioning	Muscular Endurance	Power	Maximum Strength
Preparation Period General:				
EARLY	+	+	-	-
LATE	+	+	+	+
SPECIFIC:	+	+	+	+
Competition Period: EARLY:	+	+	-	-
LATE:	+	-	-	-
NEAR COMPETITION:	-	-	-	-
TRANSITION PERIOD:	+	-	-	-

6.2 Appendix B - Guideline for the Periodization of Endurance Training

Type	1	2	3	4	5
Purpose:	Aerobic Utilization	Aerobic Transport	Anaerobic Threshold	Anaerobic Tolerance	ATP - CP
(Sessions/week) Preparation Period:					
GENERAL	4 - 5	0 - 2	0 - 1	-	-
SPECIFIC	3 - 4	1 - 3	1	-	-
Competition Period:					
EARLY	2 - 4	3 - 5*	1 - 2	1 - 2**	-
LATE	2 - 4	3 - 5*	1	2 - 3 **	1 - 2
TRANSITION PERIOD	3 - 4	-	-	-	-

* Emphasize Aerobic Transport and, if time permits, add extra Aerobic Utilization sessions.

** Anaerobic Tolerance may be either special sessions to prepare for racing or actual racing.

6.3 Appendix C - Endurance Training Methods for Rowing

Energy System	Training Effect: Fuel	Quantity		Quality		Recovery	
		NUMBER REPS/SETS	DURATION	HEART RATE	STROKE RATE	DURATION REPS/SETS	HEART RATE
Aerobic	Utilization: - primarily fatty acids with glycogen	1	60'-90'	130-150	18-22	-	-
		1-2	20'-90'	140-160	18-22	1'-3'	130-140
	- to Fatty acids with glycogen	2-3	15'-20'	150-170	20-24	1'-3'	130-140
		Transport: - glycogen	2-4	8'-10'	170-185	24-30	4'-8'
	3-8		3'-8'	175-190	26-32	3'-6'	120-130
	10-20/ 1-3		20"-60"	180-190	28-34	10"-45" 3'-6'	130-150 120-130
	Anaerobic Threshold: - Primarily glycogen with fatty acids	1	20'-90'	160-170	24-28	-	-
		2-3	8'-12'	165-175	26-30	6'-10'	120
		3-5	3'-6'	170-180	28-32	4'-8'	120
	Anaerobic	Tolerance: - glycogen	2-3	3'-5'	180-190	32-34	6'-10'
3-6			1,5'-3'	MAX	MAX	4'-6'	120
8-12/ 1-3			45"-90"	MAX	MAX	1'-3'/ 6'-8'	120
ATP-CP*			8-12/ 1-3	10"-15"	MAX	38-44	1'-3'/ 4'-6'

* Provides a small (< 5%) portion of the energy requirements during a rowing race.

6.3 Appendix D - Strength Training Programme / Guideline

Type	1	2	3	4
Purpose:	General Conditioning	Strength Endurance	Power	Maximum Strength
Exercises:	General			Specific
TYPE:				
Legs:	3	3	2	1
Legs & back:	2	2	1	1
Back:	2	1	1	1
Abdominal:	2	1	1	1
Arm flexion:	1	1	1	1
Arm extension:	1	1	1	1
TOTAL:	10-12	8-10	6-8	4-6
Repetitions:	30-40	20-25	10-12	4-6
Sets:	4-6	4-6	3-5	3-5
Method:	Circuit/station	Circuit/station	Circuit/station	Circuit/station
Rest:	Continuous	Continuous/ intermittent	Intermittent	Intermittent
Mode:	Individual	Pairs/ medecine ball	Apparatus/ equipment	Apparatus/ equipment

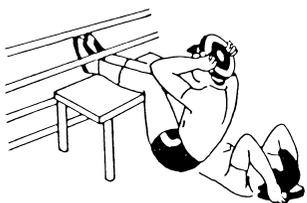
General Conditioning: A Training programme to systematically exercise all parts of the body to provide a broad base of strength on which to build higher levels of strength

Strength Endurance: A Muscle or muscle group's ability to withstand fatigue during extended periods of strength utilization.

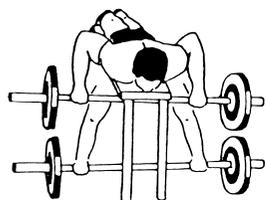
Power: A muscle or muscle groups ability to overcome resistance with a high speed of contraction

Maximum Strength: A muscle or muscle group's maximum ability to develop mechanical force

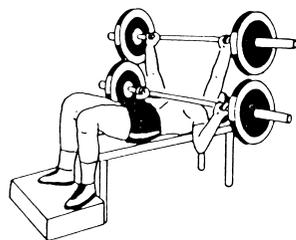
STRENGTH TRAINING PROGRAMME – Weight Lifting Technique

**AUGMENTED SIT-UPS**

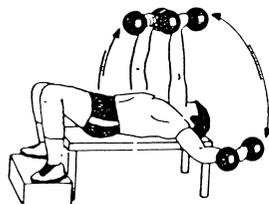
- The knees should be bent and the legs placed on a bench with the feet fixed in place.
- The up position should be the maximal upward flexion of the trunk.
- Return to the down position slowly and carefully.

**BENCH PULLS**

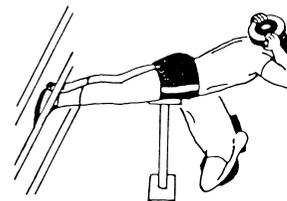
- The chest should be in contact with the bench throughout the lift.
- The hands should grasp the bar at about shoulder width.
- The bar should touch the bench at the top of the lift.
- The bar should be lowered slowly and carefully.

**BENCH PRESS**

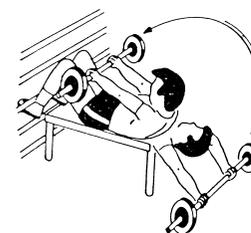
- The back and buttocks should be touching the bench throughout the lift.
- Always begin the exercise with the barbell resting on the pectorals.
- Grasp the bar equidistance from the centre.
- Press up the barbell with a slight angle towards the head until the arms are extended and perpendicular to the body.
- Pause for a moment in the up position and then bring the bar down in a controlled manner.

**LATERAL DUMBBELL RAISES**

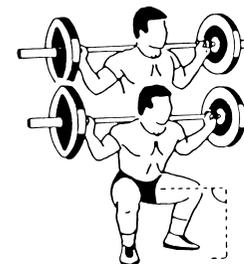
- The back and buttocks should be in contact with the bench throughout the lift.
- The arms are extended out laterally perpendicular to the body and the dumbbells are lifted with a slight bend in the elbows.
- When the dumbbells are overhead, pause for a moment then lower them in a controlled manner.

**DORSAL RAISES**

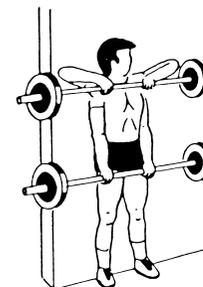
- The bench should be adjusted so that it is at waist height.
- The upper arc of movement is reached when the body is parallel to the ground.
- Return to the down position slowly and carefully.

**OVERHEAD BARBELL RAISES**

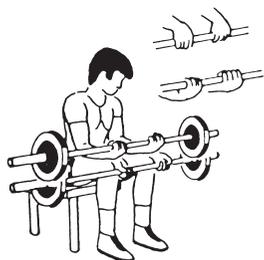
- The arms should be straight and rigid during the lift.
- Grasp the bar with the hands at about shoulder width.
- In the down position, the lift is complete when the trunk and head are parallel with the ground.

**SQUATS**

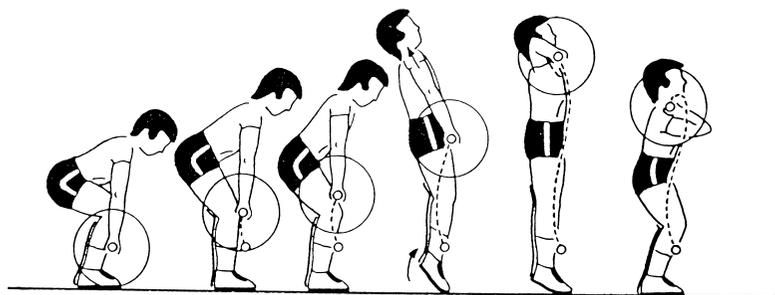
- The trunk should be erect and the head slightly raised.
- The feet should be placed firmly on the floor at about the width of the pelvis and the toes slightly opened.
- The bar should be resting behind the neck on the upper back and shoulders.
- Slowly lower the upper body by bending the knees while keeping the angle of the upper body constant relative to the ground. The squat is finished when the thighs are parallel to the ground. A momentary pause should take place before coming up to standing position.

**UPRIGHT ROWING**

- The back should be in contact with a wall throughout.
- The bar should be lifted to the height of the chin.
- The bar should be lowered slowly and carefully.
- The hands should grasp the bar about 20 cm apart.

**WRIST CURLS**

- The lower arms should be in contact with the knees.
- The arc of movement should be the points of maximal flexion and extension of the wrists.
- Return to the down position slowly and carefully.

**CLEAN****Preparation Position:**

The feet should be about shoulder width apart and the toes pointed slightly out. The arms should be extended and the hands should grasp the bar also at shoulder width. The shins should be slightly touching the bar and the angle described by the knees should be a little more than 90 degrees. The trunk should be erect and hips in a firm position.

Initial Lift Phase: The barbell should be lifted to knee level, initially, using only the legs, to an opening of about 140-150 degrees. The bar should remain very close to the body, the back properly braced

(flexed), the arms straight and firm and the shoulders squared.

Load Phase: The bar passes above the knees by opening slightly the back and dropping slightly the buttocks. This is a subtle movement that helps keep the back and hips in a firm and powerful position.

Pull Phase: The angle of the knees and the angle of the thigh/pelvis open simultaneously. At the finish, the feet are extended. The arms are extended and ready to pull the barbell up in a trajectory near to the body.

Finish Phase: The barbell is

pulled up using the arms and the inertia created by the pull phase. The bar comes to rest under the chin and on the shoulders which are slightly forward with the elbows extended. The feet should be flat on the ground, the knees slightly bent, the trunk upright and the head slightly raised.

Finish position: The athlete should stand up straight with the bar resting under the chin and on the shoulders. The elbows are extended forward and the head slightly raised. There should be a momentary pause before bringing the bar back down to the preparation position and the return down should be done in a controlled manner.

Strength Training Programme – Type II: General Strength Endurance Training

load: 60-65% max.
sets: 4-6
reps: 20-25
rest: 2-3 min.



load: 10 kg.
sets: 4-6
reps: 20-25
rest: 2-3 min.



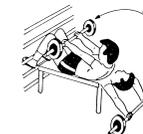
load: 15-35 kg.
sets: 4-6
Reps: 30
rest: 2-3 min.



load: 0.5 kg.
sets: 4-6
reps: 40
rest: 2-3 min.



Load: 60-65% max.
sets: 4-6
reps: 20-25
rest: 2-3 min.



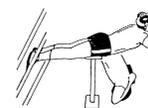
load: 15-20 kg.
sets: 4-6
reps: 30
rest: 2-3 min.



load: 40-45% max.
sets: 4-6
reps: 20-25
rest: 2-3 min.



load: 60-65% max.
sets: 4-6
reps: 20-25
rest: 2-3 min.



load: 0.5 kg.
sets: 4
reps: 40
rest: 2-3 min.

Strength Training Programme – Type III: Power Training



load: 70-75% max.
sets: 3-5
reps: 10-12
rest: 2-3 min.



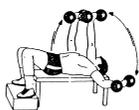
load: 60-65% max.
sets: 3-5
reps: 10-12
rest: 2-3 min.



load: 70-75% max.
sets: 3-5
reps: 10-12
rest: 2-3 min.



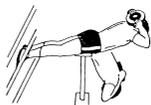
load: 1-5 kg.
sets: 3-5
reps: 15-20
rest: 2-3 min.



load: 60-65% max.
sets: 3-5
reps: 10-12
rest: 2-3 min.



load: 70-75% max.
sets: 3-5
reps: 10-12
rest: 2-3 min.

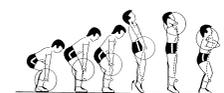


load: 1-5 kg.
sets: 3
reps: 15-20
rest: 2-3 min.

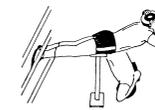
Strength Training Programme – Type IV: Maximum Strength Training



load: 80-90% max.
sets: 3-5
reps: 4-6
rest: 2-3 min.



load: 80-90% max.
sets: 3
reps: 4-6
rest: 2-3 min.



load: 1-5 kg.
sets: 3
reps: 4-6*
rest: 2-3 min.
*hold 5-6 sec. at top.



load: 5-10 kg.
sets: 3
reps: 8-10
rest: 2-3 min.



load: 80-90% max.
sets: 3-5
reps: 4-6
rest: 2-3 min.

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