



LEVEL 1

ICF COACHES EDUCATION PROGRAMME

# CANOE SPRINT

COACHING MANUAL



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CANOE SPRINT

LEVEL 1  
COACHING MANUAL

Author:

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References:

- Canoeing Coaches Manual Level 1, Csaba Szanto and Daniel Henderson, 2007  
Racing Canoeing, Csaba Szanto, 2005  
Canoe kids - Canoe Kids Activities, 2010 Canadian Canoe Coaches Education  
Kayak Excellence Coaches Book, Nandor Almasi BCU, 2007  
Piragusmo, Comite Olimpico Espanol, 1993  
U.S. Canoe and Kayak Team Sprint Racing Coach Education,, Daniel Henderson USA  
Block Periodisation, Prof. Vladimir Issurin 2010  
Australian Canoeing Inc: Coaching Syllabus,  
FISA Coaching Development Programme Course, FISA  
ICF Statutes, December 2011,

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# WORLD FAMOUS PADDLES



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## REFERENCES OF OTHER EXPERTS

The presented Education Program has been reviewed with regards the content, methodic approach, description and general design. In accordance with above mentioned criteria the program completely corresponds to world wide standard and meet expectations of practice. Several suggestions concerned the illustrations and technical details were transmitted to the author.

CONCLUSION: The reviewed program is recommended for sharing among canoe-kayak coaches of appropriate level of competence (Level 1) and is worthy for approval.

Reviewer:  
Prof. Vladimir Issurin, Ph.D.  
Wingate Institute for Physical Education and Sport,  
Netanya, Israel

Csaba Szanto's work is a great basic book that discusses every little detail, covering the basic knowledge of kayaking canoeing science. Easy to understand for novice coaches and provides a wide range of information for understanding and teaching of our sport.

This book is mastery in compliance with national and international level education, a great help for teachers and coaches fill the gap which has long been waiting for.

Being aware of Csaba's work, I am looking forward to the next levels of coach's book.

Zoltan Bako Master Coach,  
Canoe-kayak Teacher at ICF Coaching Course Level 3  
at the Semmelweis University,  
Budapest Hungary

# TABLE OF CONTENTS

	<b>CHAPTER 1 – Course Administration</b>
08	1.1 Knowledge of the course
09	1.2 Competency statements
11	1.3 Overview of the Level One Coaching Course
13	1.4 Overview of the practical lectures
	<b>CHAPTER 2 – Introducing Canoeing</b>
18	2.1 The brief history
25	2.2 The definition of Canoeing
26	2.3 Disciplines of Canoeing
27	2.4 Requirements of establishing Canoe Sprint
	<b>CHAPTER 3 – Equipment</b>
31	3.1 Boats
33	3.2 Selection of boats
37	3.3 Boat maintenance
37	3.4 Storage and handling the boats
38	3.5 Parts of the boats
39	3.6 Paddles
	<b>CHAPTER 4 – Safety and Rescue</b>
31	4.1 Safety
33	4.2 Rescue
	<b>CHAPTER 5 – Technique of Canoeing</b>
37	5.1 General introduce of technique
37	5.2 Balance
38	5.3 Strokes
39	5.4 Basic Kayak technique
41	5.5 Basic Canoe technique
44	5.6 Activity examples
	<b>CHAPTER 6 – Physical Conditioning</b>
48	6.1 Endurance, endurance development
51	6.2 Strength
52	6.3 Strength Development
55	6.4 When to exercise and how much?
	<b>CHAPTER 7 – Basic Training Methods</b>
63	7.1 Why training is necessary?
72	7.2 Training loads, frequency and methods of training
78	7.3 Training Zones of paddling
	<b>CHAPTER 8 – The Role of a Coach</b>
	8.1 Introductions
	8.2 Coaching tasks, tools and methods
	8.3 Teaching and coaching beginners
	<b>CHAPTER 9 – Introductions to Racing</b>
	9.1 The goal of training is successful competition
	9.2 Warm-up and stretching
	9.3 The start
	9.4 The finish
	9.5 Environmental factors
	9.6 Race course
	<b>APPENDIX 1-4</b>
	<b>Training programme examples</b>

## FOREWORD

ICF has shown a remarkably dynamic development in recent years and one of the signs thereof is the considerable increase in membership. Most of the new members wish to acquire the theoretic knowledge necessary to improve sport development. The ICF Educational Programme is essentially aimed at rendering help to those wanting to attain high standards of performance excellence.

Csaba Szanto has obtained unique experience in the field of canoeing. Probably there is no other specialist in the canoe sport, who has served and worked in so many places and so many different functions.

Csaba coached Olympic champions, but he has been successful with beginners as well. He contributed to the development of the canoe sport in many countries throughout the world.

Csaba Szanto wrote this book using the in depth knowledge he has of the sport. He is very much aware what is needed for someone wishing to acquire the basic knowledge of being a good coach.

The book takes a look at the history of the sport and the ICF. It presents the basic technical methods and educational tools for anyone to become a level one Canoe coach. The book includes the basic definitions of the training theory and also a rudimentary look at the Canoe competition rules.

The book gives a base to coaching of canoe athletes' work as a first step from basic-level education to the professional coaching level.

I wish every success to the participants at the courses and also to the competitors, who will be prepared and trained by the coaches benefiting from the knowledge in this book.

Budapest, April 2011

Vaskuti István  
Olympic Champion  
ICF 1st Vice President



## P R E F A C E

Over many years the International Canoe Federation (ICF) has been active in promoting and organising Canoeing coaching courses, seminars and symposiums at national and international level. The aim of the ICF has been and continues to be the development of canoeing worldwide. The ICF launched a structured progressive Coaches Education Programme in 2011. The principle goal of the programme is to help coaches at different levels to develop their knowledge and expertise in coaching canoeing skills by giving them an opportunity to participate in well defined courses approved and run by the ICF.

The ICF Coaches Education Programme will be structured using four levels. These are: ICF Canoe Sprint Level 1, Level 2, Level 3 and Level 4. These courses can be financially supported by Olympic Solidarity. Applications can be made via the National Olympic Committee.

**The Level 1 Courses:** National Courses can be organised and hosted by any National Federation. Level one courses are designed for the beginner or inexperienced coach.

**The Level 2 Courses:** National, Regional and/or International Courses can be organised by any National Federation, Continental Association and/or ICF. These courses are for experienced Canoeing coaches.

**The Level 3 and 4 Courses:** These courses are for elite Canoeing coaches and are organised by reputable Universities such as the Semmelweis University Faculty of Physical Education and Sport Sciences in agreement with the ICF.

The theoretical part of the course is conducted through online education (four months) whilst the practical modules take place in Budapest, Hungary (one month). The course programme concentrates on the Canoe Sprint discipline but also provides information that is transferable for progressing athletes' performance in other canoeing disciplines.

All courses have been designed in accordance with international standards for the sport of canoeing including sustainable environmental behaviour.

The participants who pass the examination will receive an official ICF Diploma, which may entitle them to be employed by National Federations as a canoeing coach. The coaches will be registered by the ICF on their International database.

This manual is intended for the ICF Canoe Sprint Level 1 Coaching Course for inexperienced or beginner coaches and athletes.

One of the key objectives of this manual is to provide a common framework for inexperienced or beginner Canoeing coaches. The emphasis in this manual is to help coaches to give the recreational and club paddler sound fundamental techniques for basic levels of paddling they want to take part in.

Those coaches that show the potential or whom are motivated to become higher level coaches should participate in the ICF Coaching Course Level 2 programme.

## **DESCRIPTION OF THE ICF CSP LEVEL 1 COURSE**

A course can be organised and hosted by any National Federation or Continental Association with the approval and possible support by the ICF.

The criteria:

- The application of participants shall be made by a National Federation
- The lecturer will be appointed (or approved) by the ICF
- The conductor of the course shall apply the ICF Teaching Materials
- The participants shall pay the required amount for the attendance and Diploma,
- The duration of the course must not be less than 7 (seven) days

The language of the course can be in the national language or can be designated by the organiser of the course. The content and the teaching materials of the courses will be prepared and provided by the ICF including the examination.

The participants will undertake a written examination and demonstrate their skills in a practical examination.

The participants who pass the examinations will receive the ICF Certification of the ICF Level 1 Canoe Sprint Coach and will be registered in the ICF coaches' database.



*The subjects of the courses:*

SUBJECTS/ CONTENTS	LEVEL 1
Introduction of Canoe-Kayak	Define Canoe Sprint. Introduction to the other Canoeing disciplines
Safety, rescue	Swim test, life jacket, general safety guidelines, rescue
Equipment	Simple description of boats and paddle design, storage and handling
Canoe-Kayak Technique	Introduction
	Balance, summary of Forces, movements, coordination, power application
	Basic canoe and kayak techniques, basic strokes forward/backwards
Teaching beginners	Getting beginners started, balance

*The subjects of the courses:*

SUMMARY	
Endurance	Basic training
Speed	Basic training
Strength development	Basic training
Training	Basic water training
Training Methods	Paddling, conditioning
The intensity of training	Basic principles
Conditioning with supplementary sports	Endurance development and basic strength Development
Racing	Basic information and rules
The coach's tasks	Basic principles and structure





## Chapter 1 – Course Administration

- 1.1 Knowledge of The Course
- 1.2 Competency Statements

# CHAPTER 1

## COURSE ADMINISTRATION

### 1.1 KNOWLEDGE OF THE COURSE

**Name of the course:**

ICF Level 1 Canoe Sprint Coaching Course

**Duration of this course:**

6 to 7 days approximately 30 hours

- 14 hours of lectures
- 12 hours of coaching practice
- 2 hours for examinations
- 2 hours DVD or video on canoeing technique
- Practical trainee period (minimum 6 weeks)

**Target market for the course:**

This course is designed for inexperienced or beginner coaches. It does not require previous coaching experience. The potential target market comprises teachers, instructors from other sports, recreational paddlers of various boating sports, students, and parents.

**Attendance requirements:**

Candidates must attend the full course in order to be eligible for sitting the examinations at the end of the course. The minimum 6 weeks practical period should ideally be completed with a higher level coach.

**Venue:**

The course should be conducted at a venue that has suitable place for conduction lectures and practice on the water.

**Equipment:**

- a) For the Lectures
  - White board and marker pens, computer, projector and DVD player/TV,
  - Note books and pencils for the participants.
- b) For the Practical sessions
  - Boats - if possible use stable kayaks or boats such as touring, slalom, wildwater boats, or children "mini" boats, canoe polo etc.
  - Paddles - Any available kayak and canoe paddles.

Paddle shafts for all the participants which can be from any kind of material such as a piece of

bamboo or wooden, water pipe: size approximately 110 cm in length.

Life jackets

Rescue boat with engine

**Records:**

The organiser of the coach's course and the National Federations of the participants shall keep the following records of the accredited coaches and send that to the ICF Headquarters. The ICF will establish a database of the coaches who passed the course.

Full Name, Gender, Date of birth and Contact details are required.

**Examination:**

All participants shall complete a written exam containing 20 questions. (A pass requires 16 correct answers) and shall demonstrate the basic strokes of kayak and canoe on the water in a practical test. The appointed conductor of the course is responsible for the examinations.

**Certification:**

A successful participant of the course shall receive an "ICF Level 1 Assistant Canoe Sprint Coach" Diploma. The certificate will be prepared by the ICF and will be presented to the coaches by the organiser and the host National Federation.

### 1.2 COMPETENCY STATEMENTS

The certified coach of the ICF level 1 coaching course shall be able to:

- Prepare a training session
- Conduct a safety and rescue strategy for any water session
- Demonstrate the technique of kayak and canoe
- Teach balance techniques for canoe and kayak
- Teach canoe and kayak paddling and steering
- Conduct physical conditioning training (e.g. Running, strength development)
- Prepare athletes for competition at beginner level (e.g. Club and regional level)



## Chapter 1 – Course Administration

1.3 Overview of The Level 1 Coache's Course

1.4 Overview of The Practices Lecture of The Course

### 1.3 OVERVIEW OF THE LEVEL 1 COACHE'S COURSE

Chapter Name	Unit Content	Delivery strategies	Nominal Duration
Introducing Canoeing	A short history of Canoeing The definition, Canoeing discipline descriptions Canoe Sprint description	Theory	1 Hour
Equipment	Boats, parts of the boats Paddles and accessories Handling the equipment	Theory and practice	1 Hour ½ Hour
Safety and rescue	Equipment, personal, safety, injuries, methods of rescues	Theory and practice	½ Hour 1 Hour
The technique of canoeing	Launching/porting, Balance, Strokes of canoeing Basic paddling technique of kayak and canoe including steering	Theory Video DVD Practice	3 Hour 1 Hour 9,5 Hour
Physical Conditioning	Endurance development, Strength development	Theory and Demonstration practice	2 Hour 1 Hour
Training and Basic Training Methods	Why training is necessary, Training loads, frequency and duration of training, Long distance, Fartlek, Interval and Complex training	Theory	3 Hour
The role of a Coach	Teaching skills and communication, coaching tools, methods and teaching beginners	Theory	1 Hour
Introducing to Racing	Race course, racing rules, The goals and principles of racing	Theory Video	½ Hour 1 Hour
Examination	Written test Demonstration of technique		2 Hours
<b>Total Hours: 14 hr Theory, 12 hr Practice, 2 hr DVD, 2 hr Examinations</b>			

### 1.4 OVERVIEW OF THE PRACTICES LECTURES OF THE COURSE

The subject	Discription of the task	Duration
Introducing the equipment	Demonstrate the proper storage and carrying of the boats and paddles correctly, Explain the proper way of launching the boat safely, Introduce the various parts and accessories of the boats.	½ -1 Hour
Safety and rescue	Equipment, personal safety, methods of rescues.	2 Hours
The technique of Canoeing	Launching/porting, balance, strokes of Canoeing, and the basic paddling techniques of kayak/canoe including Canoe steering.	9,5 Hours
Strength training	Plan, organize and conduct circuits training.	2 Hours

FIG 1 ATTILA VAJDA OLYMPIC CHAMPION





# CHAPTER 2

## INTRODUCING CANOEING

### 2.1 THE BRIEF HISTORY

Canoe sport is relatively new, even though the use of these types of boats dates back to the Stone Age. From the beginning, man needed to rely on rude vessels, fragile but easy to maneuver to trade and to travel. This was the origin of Canoeing such as we know and enjoy it today. Due to the long historical origins, we can define two types of canoes: the kayak and the canoe. Internationally the word “canoeing” is often used as a collective term for both canoeing and kayaking.

The Kayak originates from Greenland from the Eskimos. Built with animal bones and skins and completely covered. It was mainly used for hunting and fishing with the paddler seated in the boat.

**The Kayak** is propelling with a two-blade paddle. Steering the racing boat is by a rudder that the paddler controls with his/her feet.

**The Canoe** originates from North American Indians. Canoes are open boats used by the indigenous people of Canada to cover great distances with their goods or to carry the mail, sometimes taking advantage of the quiet waters and in other occasions conquering the aggressiveness of rapids and strong currents.

The paddler propels this kind of boat with a single bladed paddle, and rests on one or both knees, having to steer the canoe by means of movements of his/her paddle, since it has no rudder.

The first recorded Canoe regatta was organised in England in 1715. The first kayak race for women was organised in Russia in 1885.

**The International Canoe Federation**

The International Canoe Federation (ICF) was founded with the cooperation of 19 nations, in Copenhagen, Denmark, January 20, 1924. Nowadays the International Canoe Federation includes 156 affiliated countries, from all around the world.

In 1924 the Olympic Games in Paris, France included Canoeing and Kayaking as demonstration events. At the next Olympic Games in Berlin, Germany both Canoeing and Kayaking became permanent events. Since then Canoeing has always been present in the programme of the Olympic Games.

The most important International Canoeing Competitions are:

- The Olympic Games: every four years
- The World Championships held annually except in the year of an Olympiad
- The World Junior Championships every years from 2013 (the age limit is 15th to 18th)
- Under 23 World Championships from 2013
- Continental & Regional Games and Championships annually
- World Cups consisting of 3 (three) events per year



FIG.2 ESKIMOS



## Chapter 2 – Introducing Canoeing

### 2.2 The Brief History

### 2.3 Disciplines of Canoeing

## 2.2 THE DEFINITION OF CANOEING

The sport of Canoeing consists of different types of boat propelled by paddles with no fulcrum. The paddler faces in the forward direction of movement.

“Paddler” is the person travelling in a canoe/kayak boat facing forward in the direction of travel propelling the boat by means of a single paddle. The terms Canoeing as well as Canoe and Kayak generally designate the sport in most countries affiliated to the International Canoe Federation.

Canoeing is a sport that requires concerted motion between the athlete (paddler) and the boat.

The paddler has to deal with the element of water, boat and paddle in connection with his/her body.

Canoe Sprint is the name given to the sport of Canoe and Kayak where paddlers compete on calm water without any current over a marked distance to see who the fastest paddler is.

The Kayak discipline is identified in colloquial terms by its first letter, “K” accompanied by the number of crew members, one, two or four (K1, K2 and K4), while Canoeing is identified by the initial C and the number of participants in each boat. (C1; C2, C4).

- K 1 means single kayak
- K 2 means double kayak
- K 4 means four kayak
- C-1 means single canoe
- C-2 means double canoe
- C-4 means four canoe

The KAYAK (K) shall be propelled solely by means of double bladed paddle with the athlete seated inside the boat.

The CANOE (C) “Canadian Canoe” shall be propelled solely by means of a single bladed paddle with the athlete kneeling on one knee in the boat.

The paddles may not be fixed to the boat in any way. Canoe Sprint racing (Canoe and Kayak) is a technical isokinetic dynamic activity that involves symmetric movements for kayak propulsion and for Canoeing asymmetric rhythmical movements for propulsion.

Races can be organised over any distances but the ICF official distances are: 200m, 500m, 1000m and 5000 meters (male and female).

The ICF official boat categories are the following:

For men: K1, K2, K4, C1, C2, C4

For women: K1, K2, K4, C1, C2

## DEFINITION OF KAYAK AND CANOE:

### KAYAK

- Originated from eskimos,
- Seated position,
- Double bladed paddle,
- Paddling in both side of the boats,
- Boats covered,
- Controlled by rudder,
- Boats: single K1, double K2, four K4.

### CANOE

- Originated from indians,
- High knee position
- Single bladed paddle
- Paddling in one side of the boat
- Boats are open more
- Controlled by paddle
- Boats: single C1, double C2, four C4

## 2.3 DISCIPLINES OF CANOEING

- Canoe Sprint (12 Olympic Events)
- Canoe Slalom (4 Olympic Events)
- Canoe Marathon
- Wildwater Canoeing
- Canoe Polo
- Dragon Boat
- Canoe Freestyle
- Paracanoeing (Four Paralympics Events from 2016)
- Canoe Ocean Racing
- Va'a (Outrigger)
- Canoe Sailing
- Touring/ recreation

FIG.3 WILDWATER CANOEING

### BRIEF INTRODUCTION OF THE CANOEING DISCIPLINES:

#### WILDWATER CANOEING

Rough waters are the main feature in wildwater events. There are two kinds of races as long distance or classic competitions (approximately 3 km) and the shorter sprint race which is approximately 800m. There are K1, C1 and C2 events.



**Chapter 2 – Introducing Canoeing**  
2.3 Disciplines of Canoeing

**CANOE SPRINT**

The aim of a canoeing race is for competitors to paddle a clearly defined unobstructed course in the shortest possible time. The athletes race on a straight course or for 5000m makes a circuit of the course. The races over 200m, 500 and 1000 or 5000 meter distances. Canoe Sprint discipline consists of Canoe and Kayak.



FIG.7 CANOE SINGLE /C1



FIG.. 4 KAYAK SINGLE K1



FIG.7 CANOE SINGLE /C1



FIG. 5 KAYAK DOUBLES K2



FIG.8 CANOE DOUBLE / C2



FIG.6 KAYAK FOUR / K4



FIG.10 CANOE FOUR / C 4



FIG.10 SLALOM KAYAKER

#### CANOE SLALOM

The paddler has to navigate rapids and drops as well as successfully pass gates set up on the course. The course is approximately 250m in length with 20 gates. A touch incurs a 2 (two) second penalty or a missed gate incurs a 50 second penalty. Penalties are added to the running time of the competitor. In the Slalom discipline, K-1 and C1 events are held for both women and men, while the C2 events are competed by men only.

#### CANOE MARATHON

Canoe Marathon is a long distance competition of approximately three hours duration. In Canoe Marathon the competitors races over a designated long distance course on water. There are several portages at points designated by the race organisers where the competitor must get out of the boat and carry it to another point of embarkation where he/she starts paddling again. The boats have the same design as the racing boats but without minimum weight limitation.



FIG.11 KAYAKS ON THE COURSE



**CANOE POLO**

Canoe Polo is a spectacular competitive team game. Each team has five players which must score more goals in a net with a ball than the other team. Players paddle Polo kayaks, on a defined area of water.

FIG. 13 CANOE POLO MATCH



**DRAGON BOAT**

Dragon boats are large boats accommodating 20 paddlers and have a great history from Asia. The original boat accommodates up to 20 paddlers and 2 extra crewmembers; one drummer and 1 steerer. The smaller boat has 10 paddlers plus one steerer and one drummer. The races are conducted over 200, 500 or 2000m courses similar to that for Canoe Sprint.

FIG.14 20 SEATER DRAGON BOAT



**CANOE FREESTYLE**

The Canoe Freestyle is a relatively new discipline to the ICF family. The sport involves the boat leaping into a great wave behind rapids in wild rivers.

Paddlers show their skills by maneuvering the boat in one wave for 30 seconds. There is a K1, C1 an Open C1 class and Squirt Class. The moves are scored by judges. The winner is the one with the most accumulated points.

FIG.15 FREESTYLE PADDLER IN ACTION



### PARACANOEING

Canoeing has recently been added to the Paralympics in the form of Canoe Sprint Kayak and the stable Va'a. The K1, K2 and V1 and V2 are the official boats. The distance of races is 200m of the Canoe Sprint course. Athletes are classified into categories based on their restricted movements and compete against similar athletes than themselves.

### CANOE OCEAN RACING

Paddling in a type of sea kayak or surfski the athletes surf the waves in open sea. Canoe Ocean Racing is another popular discipline of the ICF. The waves of any fashionable beach are enough to guarantee good competitions and the ICF has a World Series for the best athletes in the world.

### VA'A (OUTRIGGER CANOE)

Va'a or Outrigger boats are popular in the Pacific Islands. There are single (V1), double (V2) and six team member racing boats. In the six member team boats the final crew member is the steerer and navigator.

Va'a is also a Paracanoeing discipline as part of Canoe Sprint. The V1 and V2 are the official boat for Paracanoeists.

### CANOE SAILING

Canoe Sailing has a long tradition, especially in the Pacific islands where Ferdinand de Magellan used the sail to navigate on a canoe as far back as 1520. In Europe there were several attempts to equip tourism canoes with sails of different types, but it wasn't until the 1930's that international Canoe Sailing regattas with specific rules were held.

### TOURING

Outside of competition, a completely different discipline, tourism, offers participants a wide range of possibilities for adventure and travelling along coasts, lakes or rivers. The most well-known canoe tourist is John McGregor, a Scottish lawyer who designed his own boat, the Rob Roy, in 1865 and used it to travel and explore around the world.



FIG.16 OUT-RIGGER C1 AND..



...K1 BOATS FOR PARACANOEING



FIG.17 VA'A OR OUT-RIGGER CANOE SINGLE



## 2.4 REQUIREMENTS OF ESTABLISHING OF CANOE SPRINT

- a) Suitable facilities:
  - The basic element is open water such as a lake, slow river, canal, estuary, water reservoir or sea bay. The water must be still, calm and deep enough for paddling, (minimum 80 cm depth). Canoe Sprint, Canoe Marathon and Dragon Boat training and competitions can be organised on the following water conditions:
  - Still water
  - Slow moving water with slight currents, maximum velocity 4 km/hr.
- b) Suitable equipment:
  - Boats, paddles, life jackets or vests. Power boat should be used to ensure athlete safety and for directing the training in close proximity to the athletes on the water.
- c) Coach or instructor to run the training sessions.

### TASKS FOR SETTING UP A CANOE SPRINT BASE

- Choose a suitable spot;
- Equip with boats, paddles etc.
- Hire an instructor or trained coach;
- Recruit athletes;
- Systematic training;
- Build a race course;
- Educate racing /officials (judges);
- Establish national racing system;
- Participate in various races

### SUMMARY QUESTIONS:

- In which year the ICF was established
- Explanation of kayak and canoe categories
- The Canoeing Disciplines
- Brief description of each discipline
- Description of the out-rigger /Va'a canoes
- The requirements of establishing CSP discipline







# CHAPTER 3

## EQUIPMENT

### 3.1 BOATS

The size and design of the boats differ for Canoe Sprint. The official racing boats are the following: K1, K2, K4, C1, C2 and C4.

Racing Kayaks are narrow, light, relatively unstable boats with a small space for the paddler to sit. Kayaks have a small opening known as the cockpit where the paddler slides into the boat. The kayakers are steered by a rudder controlled by the athlete's feet. In the team boats the rudder is controlled by the athlete in the front seat.

Racing canoes are light, relatively unstable boats with a covered forward deck (150cm) and after deck (75cm) with an open cockpit. Canoes have no rudder so the direction is controlled by paddle action.

*The subjects of the courses:*

Limit	Kayak			Canoe		
	K1	K2	K4	C1	C2	C4
Max. length (cm)	520	650	1000	520	650	900
Min. weight (kg)	12	18	30	16	20	30

Due to the popular use of canoeing as a competitive and recreational activity, new models and designs of boats are being introduced continuously by manufacturers.



FIG. 18 K1 RACING BOAT



FIG.19 MK 1 "MINI" KAYAK



## 3.2 SELECTION OF BOATS

With such a wide choice of Canoe and Kayak models existing selecting a particular boat can be difficult. The paddler needs to take into account his/her height, weight, type of paddling activity and also what kind of boat they would like to paddle.

It is often the case that paddlers need to use the same boat for different activities or one boat is used by several athletes, though in both cases the boat is probably not the best suited for each paddler.

### Correct Boat Size

Paddlers will develop good technique much more easily if they have an appropriate boat in relation to their size. For 12 years old and under kayak paddlers the so called “mini kayak” will generally be the ideal solution.

Paddlers can then progress to low volume stable K1’s and to the unstable racing K1’s as they develop which usually takes 1 to 2 years.

Coaches must resist the temptation to push paddlers into unstable, full size boats before their technique and balance are sufficiently developed or their body size is not appropriate for these boats. Though the racing boats may be faster, the main priority at this point is to perfect good technical skills.

It is important to encourage good habits, whilst the paddler can be easily influenced, it is vital that the boat used fits the paddler in volume, seating position and footrest position at this stage of learning.

### Correct Size Paddles

It is essential that the correct paddle length, blade size and angle are used to suit the individual paddler. However, any kind of paddle is acceptable for beginners to start with and will depend on the equipment available.

It has become clear to many of the senior coaches that paddlers often use paddles that are too long or have too large a blade area. Occasionally someone may use a paddle that is too small.

### Paddle Length

The right length is what is right for the individual paddler.

#### Kayak:

A general rule is to stand upright with one arm reaching up to the sky. The paddle should be next to the person with one blade end on the floor. The fingertips should just be able to roll over the top of the upper blade.

With the paddle held above the head, the starting point for the grip position is to have upper and lower arms at 90 degrees, power lifting style. Then adjust the grip for your individual paddler to where it feels comfortable for them.

#### Canoe:

The full length of the paddle reaches the eyebrow or forehead level of the paddler. The size of the blades can vary from 18 to 22 cm.

### IMPORTANT POINTS

- If in doubt paddle size should be smaller rather than larger.
- Paddles that are too long or have blades that are too big will prevent a paddler from using good technique.
- Paddles that are too long or have blades that are too big will prevent a paddler from training explosively or with a high enough stroke rate. This will militate against their desire to go fast, and hinder development.
- Girls will usually need shorter paddles and / or smaller blades than boys once in their teenage years.
- Paddles can be bought with split and adjustable shafts.
- For beginners, cheaper paddle models such as mixed carbon and fiberglass or pure fiberglass blade with aluminum shaft are appropriate. Full carbon paddles are not necessary.



## Chapter 3 – Equipment

### 3.3 Boat maintenance

### 3.4 Storage and handling the boats

## 3.3 BOAT MAINTENANCE

In order to keep the boat in good condition, it is required to periodically inspect the boat and to repair, as soon as possible, the occasional damage in order to avoid irreparable damage.

The proper use of the boat is the best way to maintain the boat standard. Since most damage is done through careless or wrong daily use. The following rules should be observed to ensure boat condition is maintained:

### **During embarking and disembarking**

It is important to use suitable techniques for entering and exiting fiberglass boats to avoid breaking flattening the deck.

### **Emptying the boats of water**

When there is a large amount of water within the boat (after capsizing, etc.) it is very important to use the correct emptying technique for the boat. If this is not the case, Fiberglass boats can be broken and Polyethylene boats can be permanently deformed and damaged by severe water abrasion. See the emptying methods at the “Rescue” part.

### **During portages**

Boats should not be dragged but carried.

### **Avoid unnecessary exposure to sunlight**

Even though sunlight heat does not produce serious damage in Fiberglass boats, it can produce permanent deformation in polyethylene boats.

## 3.4 STORAGE AND HANDLING THE BOATS

A Canoe or Kayak is not only damaged during its use. It can be severely damaged if it is improperly stored for long periods. Transportation can also be a negative factor if basic precautions are not adopted.

Damage caused in both cases mentioned above are different according to the material used in the canoe’s construction:

- *Fiberglass* boats do not resist excessive pressure in the direction of its vertical axis. They are very weak in the lateral joints and do not have strong resistance to external impacts.
- *Polyethylene* boats are extremely sensitive to heat and are easily deformed due to pressure concentrated on a given point. Accordingly, these differences should be taken into account during storage and transportation.

For Fiberglass boats two points of support for each boat are enough (typical boat racks with padded bars).

On the contrary, for polyethylene boats it is preferable to have a kind of racks where the hulls are wholly supported (placed on beds made of netting or canvas).

The storage of boats under direct sunlight should be always avoided (particularly with polyethylene ones).

Boats should never be placed one above the other, and racks should not be overloaded to prevent boats from being pressed against each other.

The adequate padding of the supporting bars of boat racks prevents abrasion of the boat’s surface. This abrasion would damage the gel-coat layer in Fiberglass boats or the outer layer of Polyethylene boats.

### **TRANSPORTATION STANDARDS**

An inadequate transport method can produce severe damage for any kind of boats.

In Fiberglass boats, care should be taken in tying them to a supporting structure. If they are tied very tightly, partial flattening can be produced together with the breakage of the joints. On the contrary, if they are tied very loosely, they can repeatedly impact against the supporting structure (trailer or luggage bars) and produce localised breakage in these points.



In Polyethylene boats, the excessive tension of the ropes, combined with long exposure to sunlight can produce permanent deformations of the boat.

The best system to avoid damage during transportation consists in suspending boats by placing them on canvas straps and fixing them with rubber cords. This system prevents any contact with rigid structures and provides the even distribution of the pressure of the straps over the whole cross section.

### 3.5 PARTS OF THE BOATS

#### KAYAKS

**The seat:** kayaks are paddled from a sitting position; therefore the seat is an indispensable part of the kayak. It is usually made of fiberglass or wood or a combination. A standard seat has three components: platform, support and seat parts. The usual height of the seat with respect to the bottom of the boat is about 5cm but its can be changed to suit individual requirements. If a seat is low the paddler has more stability in the water if it is high the boat is less stable but might ensure a better power

position for paddling. The seat can be flat or slightly raised at the back to stop sliding back on the seat during canoeing. The seat is adjustable to suit the athlete's leg length.



FIG. 21 KAYAK SEAT

**Foot brace:** this is an integral part of the paddler's seating arrangement and the power transmission to the boat. It is very important that every paddler's legs have the correct distance between the seat and the foot brace. The paddlers' legs should be slightly bent when sat in the seat of the boat having his feet on the foot brace. The distance between the knees and the bottom of the kayak should be approximately 25cm. The foot brace incorporates the tiller or T-bar for the rudder system to control the direction of the boat.



FIG 22 FOOT BRACES



FIG. 21 KAYAK SEAT

**Rudder:** this is a simple mechanism by which the feet control the direction of the kayak. The rudder is always operated from the first cockpit.

The shapes of the rudder blades can vary regarding the type of boats (e.g. K1 or K4) and the manufacturer.



FIG 23 K1 RUDDER



## CANOES

**Floor-board:** this provides a flat surface in the bottom of the hull which accommodates the kneepad and the foot brace and distributes the paddler's weight in the hull. It also protects the hull from damage or deformity. Some canoeists use a shorter floorboard allowing a lower position for the support foot. This position makes leaning in the boat easier.

On the floorboard is the foot brace or toe block which provides the paddler a solid contact with the boat. Sometimes a strap is used to prevent the upward motion of the foot. Some paddlers do not use any foot brace.



FIG 24 C1 WITH FLOOR -BOARD

**The kneepad:** this is a highly individualised integral part of a racing canoe. It is made to cushion and accommodate a fixed position of the knee on the floorboard. It is



FIG 25 A KNEE PAD

usually carved out of some durable, light, slightly pliable foam material. The optimal kneeling height is essential. Lower kneeling provides better stability. Generally, the knee should rest 5 to 12cm above the hull.

## 3.6 PADDLES

### KAYAK PADDLE (DOUBLE BLADED)

A kayak paddle has two blades. The blades of the racing paddle are twisted from 72° to 90° angle with respect to each other. This is done to reduce wind resistance on the blade during the recovery or swing of the stroke and assures a splash free exit from the water. Depending on the rotation there is left hand and right hand control paddles but most athletes use the right hand controlled designs.

The shape of the paddle has developed and changed, recently the so-called wing paddle (spoon) is the best shaped paddle. Introducing the wing paddle has revolutionised the kayak strokes and technique. Nowadays all racing paddlers have wing paddles which facilitates a superbly firm catch without swaying. This paddle automatically has its path in the water, which is characterized by an explosive swing stroke with body rotation. The exit is some distance away from the boat.

There are several types of wing paddle for the athlete's selection.

The racing paddles are handcrafted, traditionally of wood, aluminum, fiberglass, carbon fiber or Kevlar or a combination of the materials. The shafts are of wood or carbon fiber or aluminum. The construction of the paddle length is always a much discussed subject. The correct length, surface area and shape of the paddle is an individual matter, determined by the paddlers height, arms length, strength, style and the distance raced.



### THE CANOE PADDLES (SINGLE-BLADE)

A canoe paddle is a single bladed paddle. The paddle has been through many changes during the years. There is no standard canoe paddle however most of the paddles are similar in design.

There are now bent shaft paddles and recently several designers have tried to develop a new shape similar to the wing blade for kayak but they have not become successful so far.

The canoe paddle is constructed of wood, fiberglass, carbon fiber, Kevlar or a combination. Carbon fiber construction adds exceptional rigidity and lightness to the paddle shaft.

The general dimensions of a canoe paddle are:

- Length: should reach to the eyebrow of the paddlers head.
- Blade length: approx. 50 to 55cm
- Blade width: approx. 19 to 22cm

The blade is offset (called rake) from the plane of the shaft by a few centimeters. This facilitates better water catch with fewer splashes.

### EXERCISE:

- a) Introduce the various boats, boat parts and the paddles.
- b) Practice handling the boats correctly.
- c) Practice the adjustments of the kayak parts.

### SUMMARY QUESTIONS:

- description of the kayaks and canoes and its limitations
- knowledge of the parts of the kayaks and canoes
- the correct size of the paddles
- the correct grabbing of the paddles



"THE FINAL KICKING" AT THE FINISH LINE





# CHAPTER 4

## SAFETY AND RESCUE

### 4.1 SAFETY

Before beginners go out to the water it is very important to talk about safety.

A paddler should be a good, confident swimmer. Beginner paddlers should always go out paddling in the company of a coach or other experienced paddlers. You do not go paddling alone and unnoticed by a coach or other paddlers. A rescue boat should be available nearby if require.

Water can pose a potential danger to those who are not sufficiently versed in safe paddling practices and the technique of rescue. Here are some of the important aspects of personal safety:

#### EQUIPMENT

The first rule of safety is to know your equipment. Make sure your boat is sea worthy for the type of water you paddle. Still water with big swells can also be hazardous for racing boats. Check your boat for possible damage before starting. Make sure that the boat has its buoyancy and the styrol foam (which secures the buoyancy of some boats) is in. Fixed in the boat, your seat and footbrace are held securely at the right place. In the kayak the steering T bar and rudder must respond properly, and cables should be taut. Canoeist should check the floorboard, kneepad, and the footbrace.

#### PERSONAL SAFETY

You must know how to swim! You need not be a fast swimmer but a confident one who will not panic in unexpected situations. Your ability to swim can make the difference between a minor mishap and a tragedy.

**Note:** using a life jacket or vest while paddling gives more safety and confidence for paddlers. This is recommended for beginners or those not confident in the water.

Be familiar with the water. Make sure you know the approximate depth of the water throughout your course. Shallow spots can damage your boat and paddle, or may cause you to capsiz. Make sure your course is free of turbulence, eddies, sudden rapids, drops, unforeseen dams, submerged obstacles (e.g. rocks, stumps or other debris)

or trees. Be aware of areas that are good for landing if you must stop for emergency reasons. This is especially important if you paddle on a long course that takes you far away from your starting point.

Paddle in daylight only. In the dark it is very dangerous, even on water familiar to you. Floating obstacles and motorboats can cause catastrophe. Reflected or flickering light can play tricks on your sense of balance in the dark making paddling hazardous or impossible.

Do not paddle in severe cold. The disadvantages of paddling in cold weather are obvious. Your energy is depleted at an accelerated rate due to increased heat loss, which occurs even if you dress warmly. Because you breathe cold air respiratory ailments are more likely to occur. Paddling in wet clothing for an extended period or capsizing can lead to by hypothermia or a state of subnormal body temperature, which can be lethal. This is attributed to the single fact that wet clothing or being wet drains heat from the body about 25 times faster than air at the same temperature.

Do not paddle in extreme heat or for extended periods in hot conditions. Use protection against sun and consume sufficient volume of water whilst paddling.

#### PERSONAL FLOTATION DEVICES

There is no racing rule that requires or prohibits the use of personal flotation devices, commonly called life jackets. However, it is a good practice to wear a life jacket when your balance and confidence in the boat is not yet satisfactory and the water is rough and cold. It is also highly recommended to wear some life vest or jacket for children and beginners.

Wearing a lifejacket gives more confident to the paddlers even though they are not always comfortable for paddling. The coach can feel more secure and be more relaxed if the paddlers are wearing life vests.

**It is highly recommended that a rescue boat of some kind should be available during water training!**

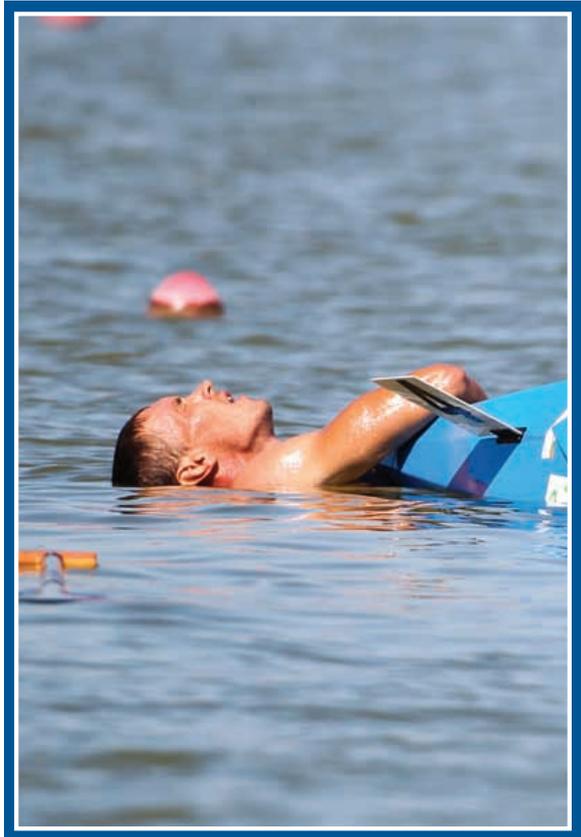


FIG 27 CUP-SIDE

## 4.2 RESCUE

You will overturn your boat, especially in the novice years and it should not embarrass you BUT you must know the proper technique for rescuing yourself and your equipment.

When you lose your balance and bracing is no longer possible, you fall out of your boat, which in most cases causes the boat to turn upside down. Your first self rescue move is to swim to the boat and turn it up with the right way. It requires a swift turn otherwise the boat will badly swamp with water. In Kayaks the trapped air keeps most of the water out, usually only a small amount of water enters the boat. However, if a kayak or canoe is pushed forward or backward in a capsized position, water will be forced into the hull, which makes righting difficult, and the boat will be very heavy due to the weight of the water. After righting your boat put your paddle in it and holds the bow or the stern of the boat and swim ashore. It is very important that you remain with the boat all the time especially if you must swim long distance. You push your boat while swimming with powerful leg kicks.

**Never let go of the boat you must always hold it! The floating boat will help keep you afloat!**

When you reach the shallows of the shore or bank you can haul out your Canoe or Kayak by pushing down on the bow until the water collects there. Then you suddenly raise it up and twist it over so that the water drains through the cockpit. Repeat this until most of the water is bailed out. Note that a fully or even partially swamped boat should never be lifted out of the water because it will break under the weight of the trapped water. Some paddlers with good skill and practice are able to climb back into a capsized racing boat whilst in the water. This is much easier if there is another boat which can help the troubled paddler to gain support and balance with side by side boats.

The following table shows an example of a person in different water conditions:



WHEN WATER TEMPERATURE IS:	LOSS OF CONSCIOUSNESS OCCURS IN:
0°C (32.0°F)	less than 15 minutes
0 to 4.4°C (32-40°F)	15-30 minutes
4.4 to 10°C (40-50°F)	30-60 minutes
10 to 15.5°C (50-60°F)	1-2 hours

These times are further lessened if you attempt to swim in cold water. Your expected swimming distance in 12°C (54°F) water is less than one mile or approximately 1.5 km.

A simple technique can extend your survival time by 35-65% depending on how you are dressed. It consists of curling up in a fetal position and keeping your head and neck above the water as much as possible.

Don't paddle in thunderstorms or in heavy rain. Shifting wind or a sudden gale can make Paddling difficult, unpredictable, and dangerous. Heavy rain usually means reduced visibility and possible loss of body heat causing the onset of exhaustion.

Paddle carefully or avoid paddling in intense heat. Heat exhaustion is a more frequent occurrence among paddlers than hypothermia. It is the result of excessive water loss in the body. When the environmental temperature exceeds 29 - 32°C (83 - 90°F) water loss occurs mostly through heavy sweating, which is the body's protective mechanism. When sweating dissipates more water than the body can furnish, dehydration, heat stroke, convulsion, and even kidney failure will occur. The use of salt tablets for the effective prevention of dehydration has been repudiated in recent years. Acute and prolonged exposure to the sunlight causes sunburn, and sometimes serious damage to blood vessels. Always wear light protective clothing in strong sunlight.

Wear sensible clothing when paddling. Dressing right for paddling does not imply an aesthetically appealing attire, although it looks nice, but rather a practical outfit which is right for the season, the time of day, and the duration

and intensity of your paddling. The paddler's clothing serves one main purpose, which is protection from exposure, whether cold or heat.

The outcome of a training session or a marathon can depend on the clothing you wear. This, of course, is especially true in climatic extremes, and in times of changing temperature. As a general rule, always wear clothing, which is soft, comfortable, lightweight, and porous, permitting perspiration without condensation inside. For kayaks splash skirt over the cockpit also retains body heat and keeps the cold out.

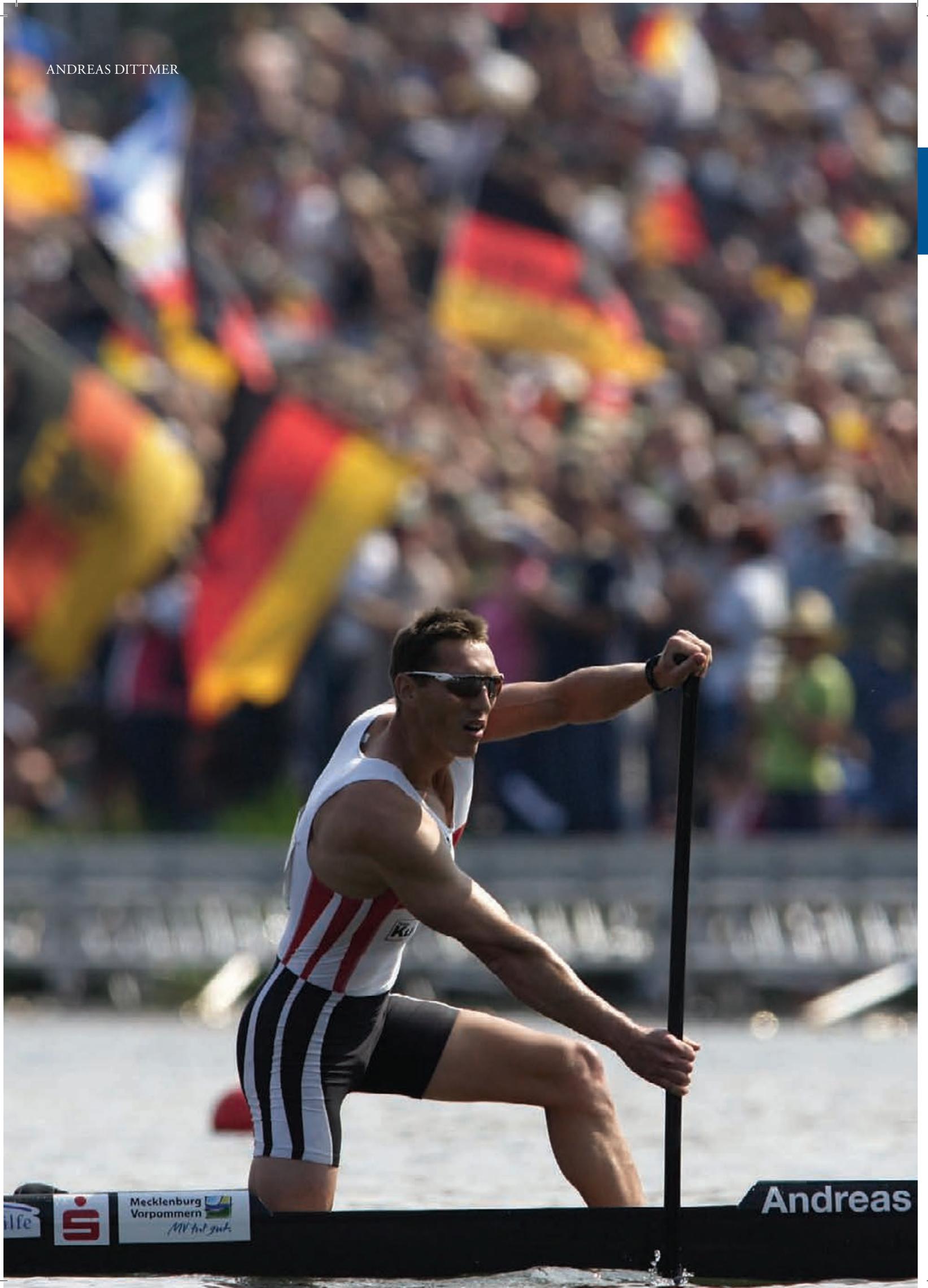
#### SAFETY RULES

- A life jacket or PFD must be worn at all times when on the water.
- No one is to take a boat without the coach's permission.
- No swimming unless authorised by the coach.
- Stay within the designated area for paddling.
- Wear proper clothing and a hat
- Keep plenty of water handy for regular hydration
- Don't overload the boats.
- If you capsize far from shore, stay with your boat. Don't swim for shore or go after drifting paddles.
- Always inform the coach of any health issues.

#### EXERCISE:

- a) In still water (or in swimming pool) paddlers (wearing life-jacket) intentionally capsize. They have to turn the boat immediately, put the paddle inside and swim to the closest shore/pontoon gripping the boat all the time.
- b) Empty the boat with the aid of a companion.
- c) Empty the boat without help.
- d) Participants sit in the boat pass their paddle under their boat and bring it up on the other side without tipping. Paddle is then passed back under the boat to the original side.

ANDREAS DITTMER





# CHAPTER 5

## TECHNIQUE OF CANOEING

### 5.1 GENERAL INTRODUCING OF TECHNIQUE

In this Coaches Manual Level 1 the Technique of Canoeing will be explained for:

- Technique concepts
- Handling, carrying and launching the boats
- Balance
- Strokes
- Role of the coach
- Basic technique of Kayaking
- Basic technique for Canoeing

#### FACTORS OF THE TECHNIQUE:

- Balance/ stability
- Strokes
- Power transmission
- Coordination
- Efficiency
- Rhythm
- Style

#### TECHNIQUE CONCEPT

The goal of Canoe Sprint competitors is to travel the length of a racecourse as fast as possible and to beat the other athletes. *Technique is one of the main factors of how fast an athlete will be able to paddle.*

#### TECHNIQUE CAN NEVER BE PERFECT!

Athlete performance in Canoeing is very complex depending on highly refined technique, well-developed physical capabilities combined with speed and competitive spirit. As the technique is a critical factor in maximizing speed the understanding of the teaching and learning of the paddle technique is of paramount importance.

Canoeing is within the group of cyclic-endurance sports. The “perfect” technique is an ideal movement to

propel the boat forward with the greatest efficiency. Essentially there is not a perfect technique which cannot be perfected. This means to learn the ideal technique of paddling it is an endless process from the beginning until the end of an athlete career. During the novice period in canoeing the basic technique is the same for all paddling disciplines.

In Canoeing there are different components, such as, the water, boat, paddle and the paddler. These elements have relationships with each other which make the correct paddling technique very complex.

**The goal of the perfect paddling technique and its development is to achieve the fastest speed possible of the boat.**

All the effort that we expend to achieve a “good technique” is simply to go faster regardless of the look and the power produced by the paddler.

The short term goal for the paddling technique is to be able to stay in the boat without capsizing and able to control balance. Due to beginners having a lack of balance in the boat the technical paddling drills should be done on dry land first. The technique should be transferred to “boat paddling” parallel with the improvement of the athlete’s balance.

#### The following factors influence paddling technique:

- Balance
- Loading: The total of all forces
- Speed of prime movers (eg. arms) which constitutes the stroke rate
- Co-ordination of movement
- Power application
- Stroke length and speed correlation
- Glide
- Rhythm
- Individual style

*Remark: not all of the listed factors will be discussed in this manual.*



## Chapter 5 – Technique of canoeing

- 5.1 General introducing of technique
- 5.2 Balance

### Main focus in the beginner phase (0-12 months):

- Stability
- Basic technique
- Simple mechanics (physics, biomechanics, hydro-mechanics)
- Boat movements

### The objectives of the Coach:

- Introduce technique in such a way that the beginner paddler has a clear understanding of the technical aspects of the sport
- Help the paddler have a sound basic understanding of the techniques
- Help the paddler recognise what good paddling feels like and are able to verbalise this feeling.
- Help the paddler develop the skills to self-correct themselves to the above mentioned state.

### HANDLE, CARRY AND LAUNCH THE BOATS

If the beginner has satisfactorily passed the dry land exercises the time has come for on-the-water practice. The tasks are as follows:

- Learn to handle, carry and launch the boat.
- Get in and out of the boat. (Embarkation and disembarkation)
- Make oneself comfortable and to achieve the right posture in the boat.

The proper handling of the boat and paddle is important if one is to avoid damage to the equipment, or at least to protect the hull from scratches.

The paddler stands on the port side of the kayak or canoe. Grasp the ridge around the cockpit of the kayak or in the centre of the canoe close to his/her firmly with both hands at the balance point. Then lift it off the rack or ground and lift the kayak onto one of the shoulder.

Launching the boat can be performed from a beach or edge of a river, or more easily from a floating dock.

To launch the kayak or canoe the most convenient way is from a pontoon close to the water level but it is also possible directly from dry land onto the water. To get into the boat it's useful to use the paddle as a support. This will be described separately at the special part of technique of kayaking and canoeing.

From the pontoon or dock, stand close enough to the water's edge to have your boat over the water when you launch it. Carefully lower the kayak or canoe into the water. Note: the paddler's knees can support the boat when lowering and which can easily guide the arms outward to prevent the hull from bouncing against the edge of the dock. The removal of the boat from the water should follow the same basic moves but in reverse. Further information on the mentioned details will be described later in the *Kayaking and Canoeing* part



FIG: 28 CARRY THE BOATS



## 5.2 BALANCE

Good balance is critical to successful canoeing. Balance is always a factor for paddlers, from the beginner to the elite athlete. A strong sense of balance becomes more and not less important as paddlers advance to racing.

The characteristics of the practice of Canoeing determine that the stability of the paddler and therefore the boat is considered of great importance in the technical training of athletes. If the paddler cannot solve his stability problems in the kayak or canoe, it will result in development becoming partially or wholly limited.

The higher the centre of weight means the less stable the boat in the water. By changing the height of the seat in a kayak, can change the paddlers balance, that is, the lower the athlete is in the boat the more balanced he/she is likely to be. The same occurs in the canoe when the height of the knee-pad is modified.

Due to its nature the Canoe racing boats are relatively unstable therefore the balance of the paddler is a necessary basic technique that must be learnt.

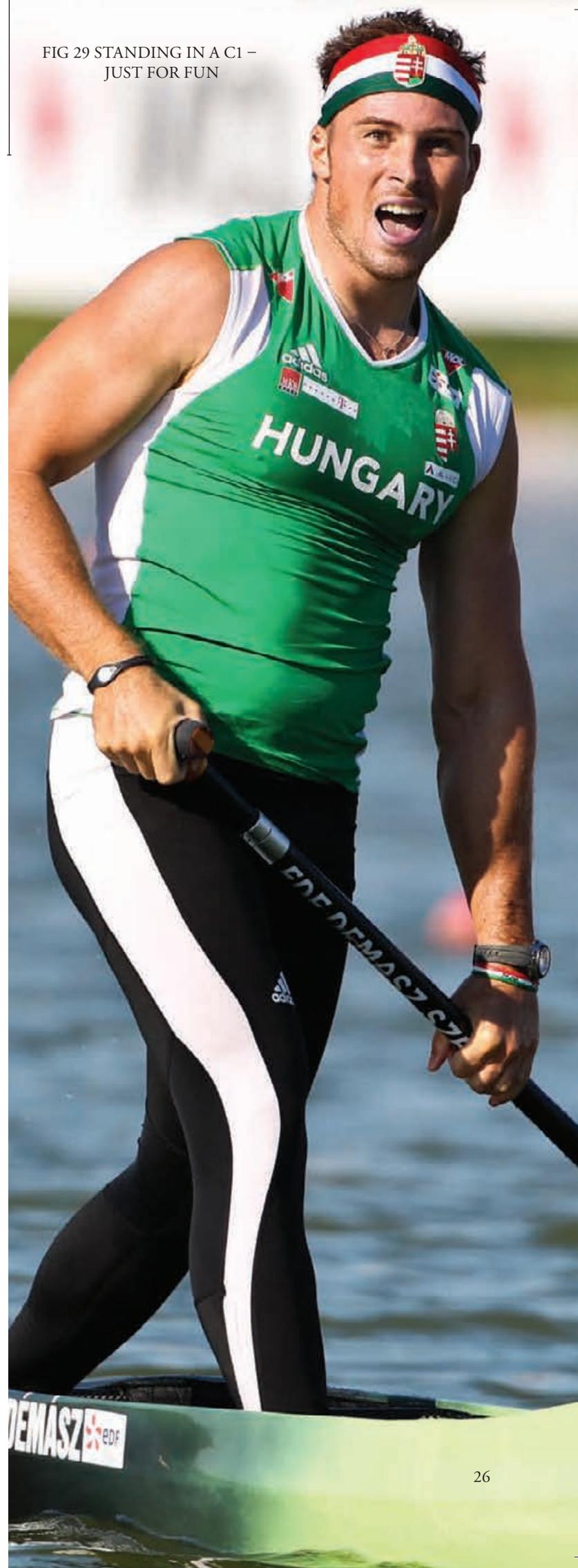
Any paddle motion that involves correcting the balance of the boat directly takes away from the propulsion of the vessel, thus reducing forward speed.

The stability of the paddler depends on several internal and external conditions.

Internal conditions are weight, height, sense of balance, age etc. all these can be controlled by the paddler. The external elements are wind, waves and currents which cannot be controlled by the paddler.

**BETTER BALANCE COMES WITH PRACTICE!**

FIG 29 STANDING IN A C1 –  
JUST FOR FUN





## Chapter 5 – Technique of canoeing

### 5.2 Balance

### 5.3 Strokes – general for kayaking and canoeing

#### A brace

The Brace is a Balancing maneuver that keeps the boat upright if it is tilted towards its side. Use the paddle by placing the blade against the surface of the water and press downwards. Do not release the paddle, use the hips to regain the balance of the boat and return to equilibrium state!

#### Feathering

Use the paddle for bracing as above with the back of the blade on the water surface, exerting pressure on it. When the boat is not moving, the paddler should move the blade back and forth, stroking the surface of the water. . The paddle should be at an open angle to the water, this technique is known as Feathering.

#### Teaching Feathering

- The first step to teach balance in a boat is to teach to the skill of brace and of feathering.
- The purpose of feathering is to provide stability in the boat.
- Feathering helps the paddler to use the water to balance and keep the boat upright.
- Feathering should be taught and practiced on the dock before the paddler tries it on the water.

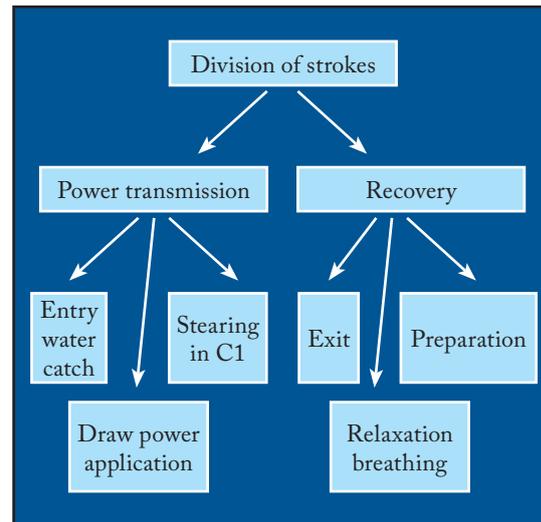
*Skill Tip: It is easier to keep balanced in the boat if it is moving!*

### 5.3 STROKES – GENERAL FOR KAYAKING AND CANOEING

The paddlers strokes drives the boat forward. To understand the technique better we have to analyze in detail the common elements of the strokes.

While it can be counterproductive to isolate individual elements and think of the stroke only as a series of distinct components, it is helpful to see the stroke cycle in terms of key phases. To that end we will look at a stroke through a whole cycle to the same position ready for the next stroke.

#### Division of Strokes



We can divide every stroke into basic elements:

- 1) **power transmission**  
in this period the paddle is in the water
- 2) **recovery**  
in this period the paddle is in the air

#### THE POWER TRANSMISSION

The paddle propels the Kayak and Canoe. The force from the paddle has to transmit through the body to the boat. This seems incorrect don't you mean the following.

The force exerted by the body in its movement has to be transmitted through the paddle to propel the boat forward.

The paddler's workload is the primary component within a stroke. The power transmission is the most important part of the stroke and is a major factor in efficient technique. Loading body weight onto the paddle, or as much force as the body can develop (total forces), involves getting all the muscles of a paddler's body involved in the stroke action. These motions involve all the muscles of the body, from torso to arms, to shoulders to hips and legs, whilst simultaneously the body weight is loaded on to the paddle.



The power transmission consists, of the following phases:

- Water catch or Entry
- Draw (Power application)
- Steering movement (only in canoe)

**POWER TRANSMISSION:**

**the given strength to the paddle shall be transferred to the boat via the athlete's body.**

**THE WATER CATCH (ENTRY)**

This is the segment of the stroke from the moment of contact by the blade's edge with the water until it is fully submerged. This is the moment when the most power can be transmitted from the paddler's body to the paddle during a stroke.

**Execution of the Water Catch:**

Utilising a dynamic swing from the preceding recovery phase, power can be added by applying to the paddler's bodyweight onto the paddle. The paddler thrusts the paddle at an acute angle (approximately 45 to 50 degrees) into the water close to the hull.

The correct execution is for the paddler to drop the blade into the water quickly, taking the shortest amount of time possible to submerge the full blade. The time taken for this action is closely related with the paddler's stroke rate. At the phase of the catch the water is in contact with the total surface of the blade. The highest force acting on the boat is generated only if the blade is fully submerged in the water as quickly as possible.

**THE DRAW (POWER APPLICATION)**

The Draw follows the Water Catch as a continuous integral part of the stroke. Within this period the most important task is to transmit all the power from the paddle to the boat. The paddler presses his/her weight onto the paddle and keeps the paddle in the vertical plane as long as possible in the water.

During the Draw the athlete shall press down and hold the full blade under the water.

The force of the Draw Phase can be divided into two components.

The first is the rotator movement of the paddler's trunk where the highly stretched back muscles are rotating and turning back to the paddler's basic position. The second component is a straight pulling action using the arms. So, the order of muscle group usage is from the largest muscles to the smaller muscle groups so as not to over fatigue the paddler.

Important advices to the power transmission phase:

- Push the boat with your trunk to the fixed (locked) blade (not logical description)
- Keep downward pressure on the blade all the way from catch to exit to ensure good connection and power transfer as the paddler's trunk rotates.
- Keep the paddle blade locked in the water. Simultaneous trunk and arm rotation moves the boat forward against this locked point in the water.

**STEERING**

This control movement is necessary only for the steering of Canoes. See Steering in the Canoe technique section of the book.

**EXIT**

Immediately following the draw or the steering motion, the blade swiftly emerges from the water. See Technique of Kayak and Canoe for further information

**RECOVERY**

This is the second main part of the stroke. In this section of the stroke the paddle travels from exiting of the water to the next catch. The paddle is not connected with the water so in this stage power transmission to the boat is impossible.

**RELAXATION**

The main emphasis is on muscle relaxation and breathing whilst moving the paddle towards the Water Catch position.

During the Recovery Phase the muscles must change from a relaxed to a contracted state. This is also a vital part of the overall body co-ordination. The recovery phase can assure a sustained effective paddling motion without a painfully tense body which wastes energy.



## Chapter 5 – Technique of canoeing

### 5.3 Strokes – general for kayaking and canoeing

During the Recovery Phase, breathing is very important in order to maintain energy requirements of the body.

- After the exit the muscles relax and shoulders lower as air is exhaled from the lungs.
- As air is then inhaled, the muscles tense ready for the next catch phase.
- This phase should be as short as possible to prevent excessive deceleration of the boat between strokes.

#### PREPARATION

It is the last segment of recovery. As the paddler holds the inhaled air his/her whole musculature tenses in preparation for the next Entry or Water Catch.

#### INDIVIDUAL STYLE

All the individual paddling styles are based on the same

technique. Investigating a technique style visually is difficult because the most important part takes place under water, that is, what the paddle does. It is impossible to see how the Power Transmission phase occurs and therefore it is difficult to relate the speed of the boat to the paddler's technique just by sight alone. The fastest paddler will be the one that can apply and execute the phases of the strokes the most efficiently and with the most force.

#### SUMMARY QUESTIONS:

- How the balance can be improved?
- The division of the strokes.
- When the paddler needs to birthing at paddling?
- What the “power transmission” means?
- What is the difference between the technique and style?



## 5.4 BASIC KAYAK TECHNIQUE

### SITTING IN THE KAYAK

After the kayak is on the water the paddle is placed across it, in front of the cockpit, with one blade resting lower face down on the dock. The paddler crouches on the dock beside the launched boat facing the same direction as the boat.

The closest hand holds the front of cockpit. The other hand remains on the dock for support.

Leaning slightly forward with knees half bent and holding the centre of the cockpit together with the paddle, the

paddler lowers his/her weight and leans slightly on the left hand resting on dry land. Then placing the right foot in the centre of the hull, 25-30cm in front of the seat. The paddler should then lift his/her left foot into the cockpit while carefully shifting their bodyweight to the floor of the boot. The paddler lowers his/her body onto the seat and slides their feet forward towards the foot brace.

The paddle stroke for the Kayak is a continuous fluid movement where forces are transmitted by different parts of the body, with the boat and water interacting continuously. The result is that the boat moves forward continuously and this should always be the main focus of attention in paddling and coaching.



FIG 30 KAYAK STROKES



### Using a Kayak Rudder

- The rudder is directed by applying pressure to the footboard stick which is attached to the rudder.
- Moving the stick to the right will turn the kayak to the right.
- Moving the stick to the left will turn the kayak to the left.
- Practice is required to obtain the required degree of turning for the kayak.

### THE BASIC SEATED POSITION IN A KAYAK

In the Kayak, the paddler is sat on a seat. The contact between the paddler and the boat are the seat, hull (through the heels of the paddler) and foot rest (the feet).

The position within the Kayak must be a comfortable one, paying special attention to the position of the hips, since they condition the task of transmitting the generated force to the boat causing propulsion. The paddler's trunk should be vertical slightly leant forward (10 to 15 degrees).

The paddler should be seated on the centerline of the boat for perfect balance. The paddler should have his/her legs parallel and knees slightly bent at an angle of approximately 120 to 130 degrees. The knees should be slightly flexed to allow for the alternate push of the legs (flexion - extension) against the foot rest.

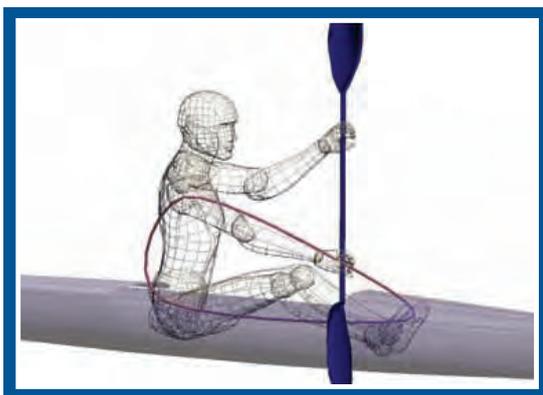


FIG 31 SEATING POSITION

The back is straight; the torso is vertical or leaning 10 to 15 degrees forward. The centre of gravity of a Kayak paddler in a boat should be on the centre of gravity of the kayak or a little bit in front of it. This will depend on the paddler's

weight. The correct position can be determined by carefully observing the water level of the hull. The feet should have their heels resting on the bottom of the hull and the metatarsal area contacting the footrest.

The Paddler should assume the relaxed position (basic position). The paddler should rotate his/her trunk for a maximum reach forward with one arm, while the other arm is in a contracted bent position. The elbow has to be a little higher than the shoulder and the hand about the level with the top of the head.

*Coaching Tip: The paddler must have the right posture to carry out an effective stroke!*

- Paddler sits on the boat centre line.
- The legs are forward with the knees at an angle of 120 to 130 degrees.
- Feet are able to put firm pressure on the footrest.
- Back straight.
- Torso leans 5 to 10 degrees forward.
- The paddler's centre of gravity is on or slightly in front of the centre of gravity of the kayak.

### BALANCE

The racing kayak is a very unstable boat. To learn to feel the water and have balance in a boat takes a long time. It takes several months or often years to get the necessary experience. Lack of balance impedes good technique and the speed of the boat.

It is easier to start in a touring kayak or another type of stable kayak boat before progressing to less stable boats. The novice must learn to feather or brace that is how to bring the blade up on the surface of the water and press on the water with the back. This is an important move to learn as it creates a point of support outside the boat to provide added stability.

Practice:

- 1) Participants paddle their boats with their hands instead of their paddles
- 2) Pretend the paddle is a spear and throw it in front as far as you can.
- 3) Using hands only, move the boat to the paddle and fish it out of the water.



### THE STROKES

First a novice has to be familiar with the paddle's feathering. Racing paddles are feathered approximately 65° to 80° with left or right hand control. Most of the athletes use the right hand controlled paddle. The home position (basic) is when the line between the knuckle and wrist of the control hand is perpendicular to the blade on that side. The non-control (usually left) hand holds the paddle firmly but is allowed to twist in the hand. Practice the quick wrist rotation that will feather the paddle while paddling. Note that feathering is needed only with right hand controlled paddle when swinging from a left draw to a right draw. For left draw blade is already in position.

### WATER CATCH OR ENTRY

The phase when the paddler dropping pushing down the blade into the water and the blade becomes fixed and locked at the enter point.

- The top hand is around forehead height and the trunk is rotated at approximately 70 degrees.
- Drive the blade down and forward into the water using the body and both arms together as one. Muscles are firm and there is a good connection between blade and body.
- The blade should be moving towards vertical as it enters the water.
- The blade should enter the water fairly close to the side of the boat to prevent the torque forces from causing the boat to snake.



FIG 32 ENTRY OR WATER CATCH

- Synchronize the leg push with the catch. The foot compresses the footrest slightly before the catch to support the catch, with the knee flattening as the trunk unwinds its rotation.

### DRAW

The blade goes through the water firmly with an energetic and simultaneous arm and body rotation. The direction of the power is downward.



FIG 33 POWER APPLICATION PHASE (DRAW)

### EXIT

The blade quickly cuts by snapping the draw wrist upward and following with the lower arm. Swing the paddle quickly by lifting the exiting hand to forehead level. Rotate the control wrist fully position the blade before entry in the water on the other side.

**The kayak paddling motion follows a circular-rhythmical pattern of the arms and shoulders.**



FIG 34 EXIT AND RELAXATION



As the blade approaches the level of the hip, the lower wrist snaps sideways and upwards, with little drag, in a quick clean action and feathers the blade for the next stroke. This will happen in reality when the hand is level with a point just behind the knee.

**The two arms have to work together with the torso rotation!**

#### RELAXATION

In this phase of a stroke the shoulders are lowered, most of the muscles are in relaxation. During this period, the paddler rotates the paddle shaft and exhaling – inhaling should also take place.



FIG 35 RELAXATION AND PREPARATION OF THE NEXT STROKE

#### THE LEG WORK/ LEG PRESS

Kayak paddlers are required to use their legs as well as arms to propel the boat forward. The Leg push should be synchronized with the arm work to create force on the boat through the footrest. At the Catch Phase the inside knee flattens out at the same rate as the arm pulls in the water. The other main factors of kayak technique, namely power transmission, coordination, rhythm, efficiency and style will be described in more detail in the advanced technique of canoeing section.

#### THE BASIC FORWARD KAYAK STROKE

The forward stroke is the primary stroke as this makes the boat go forward at speed. As it was described the stroke is composed of different parts: counter rotation, catch/load,

exit/glide and relaxation. These are not the same terms as used in the diagram, suggest to keep to same terminology. From the basic sitting position, rotate the onside hip trunk forward and the offside backwards; this is the counter rotation. This movement is to extend the onside blade as far ahead as possible where body weight can be loaded onto the paddle during power transmission. I think this should be much earlier at the beginning of the stroke cycle.

The onside arm is stretched ahead while the top or offside arm is bent so top hand is close to the offside ear. Elbow position of the top arm is critical for body weight loading.

At the catch, spear the paddle ahead with the onside arm is straight and the top hand is in front of the forehead. Once the body weight is loaded, onside leg drive and offside leg-pull, quickly followed by torso and shoulder rotation.

This effort moves the boat past the blade in the water. During the end of one stroke exit, the goal is to get the blade out of the water as quickly as possible. To glide the boat, the kayaker continues the rotation with both hands near the shoulder height. At the initial phase of the glide kayakers can take a momentary relaxation of their muscles. Putting the parts of the stroke together should result in a rhythmic motion. The goal is for the paddle blades to move relatively quickly through the water and slower in the air. Sizing the length of kayak paddle.

#### COMMON MISTAKES OF THE BEGINNERS

- Paddle not fully submerged (less force can be applied)
- Bent on-side elbow (short stroke – less force)
- Low elbow dropping below the shoulder preventing bodyweight loading
- Negative angle of the paddle at the Catch (limits the ability of loading)
- Too long a stroke and slow blade movement at end of cycle (causes drag and slowing of the boat)
- Overuse of arms instead of trunk rotation (overuse of the smaller muscle groups).



## Chapter 5 – Technique of canoeing

5.4 Basic kayak technique

5.5 Basic canoe technique

### SUMMARY QUESTIONS:

- Which is the trunk position of the paddler?
- Describe the proper legs position of kayakers.
- What is the most important trunk movement of the proper technique?
- In which angle of the paddle should be at the entry phase?
- Describe the legs movement of the kayakers.

### 5.5 BASIC CANOE TECHNIQUE

As mentioned previously, the technique for Canoe and Kayaking have some common principles. Like the kayak stroke, canoeing is characterised by dynamic strokes, but on one side of the boat only.

Learning to canoe is a long process from beginner to reaching elite standard technique. The first aim is to be able to stay in the boat, going straight and maneuvering which can take several months or years for a beginner to master. Because canoeists paddle only on one side of the boat it is critical to keep the canoe going forward in a straight line. The kneeling in the boat is another challenge for the beginner canoeist.

FIG 36 A PERFECT STROKE AT DRAW PHASE





**KNEELING INTO A CANOE**

To enter a canoe, face forward, hold the boat parallel to the dock, and place the hands on the gunwales with the fingers inside the boat to keep them from being pinched between

the boat and dock. Step into the centre of the boat and kneel on the kneepad. In a stable recreational canoe beginners first sit on the bottom, then kneel on two knees and then finally progress to kneel on one knee.

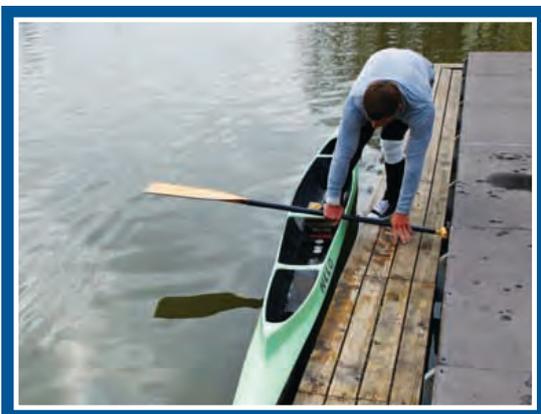


FIG 37 LAUNCHING C1



#### BASIC POSITION

The knee of the supporting leg (A) is placed on the knee-rest and this is positioned over the longitudinal axis of the canoe. The centre of support of the knee is 2-3 cm towards the on side and behind the centre point of the canoe, in order to place the canoeist behind the centre of rotation of the boat. This position causes a slight elevation of the stern in the static position.

The knee located closest to the paddling side rests on the kneeling pad. A right sided paddler kneels on his/her right knee, and a left sided paddler kneels on his/her left knee. The foot of the hind (don't understand hind) supporting leg rests over the hind footrest that is fixed to the grid (what is the grid), keeping a small angle with respect to the longitudinal axis of the boat. Fixing the heel with a strap or brace that fixes the foot firmly to the canoe completes this support. (this paragraph is weaker than the rest)

The governing leg is placed over the grid with the foot angled 15° to 30° with reference to the longitudinal axis of the boat. This foot can be moved to alter the point of support to lean the boat as it turns. Many canoeists use non-slipping surfaces to avoid the forward sliding of the foot during the paddling stroke. This enables the canoeist to push adequately during the stroke.

The three points of support –the front foot, the knee and back foot form a triangle that represents the supporting base of the canoeist in the boat, and the form of this triangle will determine the paddler's balance. The first task is to teach the correct kneeling position to obtain the optimum stability in a canoe.

The position of the supporting foot is also important. It should be slightly "pigeon toed" with the toes turned toward the paddling side. The toes of the other foot should rest on the floorboard in a curled up position.

The position of the supporting leg can vary from 95°-120° at the knee. Smaller angle of the leg results in less stability, but the paddler is less likely to push down the bow of the canoe while stroking (bobbing).

Generally speaking the centre of gravity should be at the geometrical centre of the canoe. Slight departures from this

rule are sometimes necessary due to body height or weight considerations. Paddlers who are tall or heavy should kneel slightly behind the centre of gravity, while lighter paddlers should kneel slightly ahead of the centre.

The correct kneeling position in a canoe is determined by observing the waterline of the boat or the so-called trimming. This must be done during paddling at full speed.

#### Paddling Position

- The knee on the paddling side of the boat rests on the bun or kneeling pad. A right sided paddler kneels on his/her right knee, and a left sided paddler kneels on his/her left knee.
- The foot of the front leg is positioned behind the knee, with the toes flexed to support the weight of the leg.
- The front leg is bent at approximately 90 -100 degrees.
- The foot of the front leg is positioned so that the toes are pointed towards the paddling side (the foot is flat against the bottom of the boat)
- The kneeling leg is placed on a slight angle to the boat to assist stability.

#### BALANCE

One of the major difficulties in learning to canoe is balance. But it improves significantly with practice.

Balance becomes difficult in the Olympic C1 boat, especial in the latest designs. The kneeling position is less secure than sitting because the centre of gravity is much higher than in a sit down canoe or in a kayak. A novice should begin in a team boat or a touring open canoe. First, in seated position and then in a high kneeling position. Another possibility is to add into the boat some heavy extra weight for better balance.

#### STEERING

Steering of the canoe is a barely visible movement, yet it constitutes a vital phase of the stroke. Steering occurs at the finishing phase of every draw. Without it there would be torque acting upon the canoe because it is paddled on one side only. In other words, the canoe would not move on a straight line, but it would turn gradually in a large circle.



**Basic forward stroke**

The forward stroke in a canoe is composed of six parts: counter rotation, catch, load, steering, exit (gliding) and relaxation. From the basic kneeling position, rotate the on-side hip and trunk forward and the offside backwards; Definitions of onside and offside need to be made in glossary or paddle side or non paddle side. this is counter rotation.

Open the top (which is top shoulders both are even, left or right?) shoulder so it moves behind the paddler’s head. The rotation assures the extension of a stroke, the blade should

be as far ahead as possible (of what?). To apply power, the body weight must be on the paddle during the power transition phase of a stroke. Both arms are straight or slightly bent at the catch phase. The steering is integrated into the forward stroke and is part of counter rotation. This is not as clear as kayak and is not as detailed a description as kayak. For me this needs further description broken down under the titles as per kayak.

*Remark: several months or years of technique development is required to master canoe steering.*

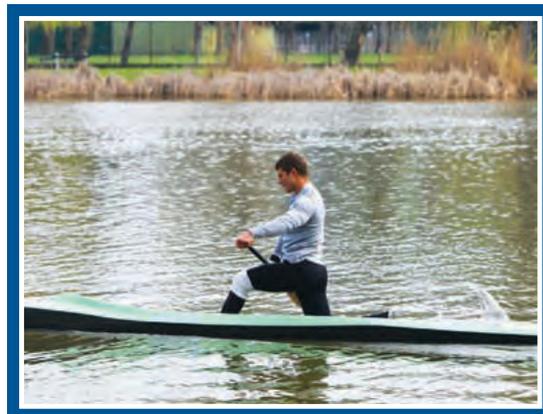


FIG 41 PADDLING IN C1



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**SCS**

**RAI**

**OR**



### MOVEMENT OF THE CANOE

Every draw terminates with a steering motion. For a novice this is usually a difficult task, so it must be practiced until it becomes a dynamic and fluid extension of the draw and does not make the stroke ineffective. The paddler must develop a feel for the adequate force for steering that is necessary to keep the canoe in a straight line, or to turn the canoe to a desired angle.

#### COMMON MISTAKES OF BEGINNERS

- Catch with bent elbow (shortens the stroke)
- Throwing the hips back or offside is out of rhythm (reduces body weight loading on the paddle thus affecting power)
- Pulling the paddle solely with the arm and not through torso rotation and lift (removes the ability to load the body weight onto the paddle)
- Negative angle of the paddle at the catch / draw (reduces body weight loading onto the paddle)
- Stop or slow the movement of the paddle for steering (slows the boat down)

### TURNING AND MANEUVERING

Turning the boat in each direction:

- a) turning toward the paddling side and
- b) turning away from the paddling side
- c) direction of the movements of the single canoe (C1)

#### a.) Turning toward the paddling side

When there is not enough room for a wide turn, forceful steering can be applied in the form of long “J” shape strokes and by slightly “dragging” the paddle close to the stern of the canoe. This pushes the stern of the canoe to the opposite side, whilst the bow turns to the paddle side of the boat.

Leaning the boat in the opposite direction to the turn will further ease the turning maneuver.

Turning towards the paddling side in a small arc is done with a more pronounced draw stroke at the bow; followed by paddling in reverse (called back water) from the stern. During this maneuverings the paddler should also lean the

canoe to assist the turning. Bending forwards takes weight off the stern which facilitates the turn of the canoe. Usually 3 to 4 powerful strokes, as described above, can turn the canoe a full 360 degrees. The obvious disadvantage of this maneuver is that the canoe loses all its forward speed.

#### b.) Turning opposite the paddling side

Turning opposite to the paddling side is easier and results in less speed loss compared with the turning to the paddle side. The canoeist should lean the boat to the paddle side and execute a large “C” stroke, Water catch / entry required in front close to the bow then pressing the paddle away from the canoe.

#### c.) Movement of the C1

First, the canoe sways from a straight course to the left or to the right depending on the paddling side. This movement is minimized or eliminated by the correct steering technique. In practice we push the stern (into a straight line) of the canoe with every stroke into a straight line and the canoe moves off line again in the next draw.

Second, the canoe moves up and down in the water as it moves along, which reduces speed, The paddler should eliminate this due to the boats velocity fluctuation between strokes by developing effective stroke technique. Paddling errors further compound this effect.

#### The effect of cross wind on the canoe:

At this point it is helpful to discuss steering in various wind conditions. In case of a headwind or tailwind, steering is almost unaffected. Broadside (cross) winds are generally called left or right sided cross wind, whether the wind blows on the left or right side of the canoe’s forward direction.

The canoe that is paddled on the right side, in a left sided cross wind is unfavorable because the paddler must also counter the wind action on the boat by steering. The wind pushes the stern of the boat to the right, which turns the canoe to the left. The paddler needs to adjust this by steering and therefore loses forward motion speed.

In effect, the wind adds to the torque (due to paddling the canoe on only one side). The wind acting upon the canoe



requires the paddler to steer with more force to maintain the speed of the boat in a forward direction.

In this situation the paddler can lean the canoe by shifting his support leg into the wind which increases the wetted surface of the boat thus the drag increases, making forward movement easier.

In a right hand side cross wind the same canoe is advantageous and left side paddlers will be handicapped. In the situation that the wind is very strong everybody is affected.

Note: Strong side wind does not favor anybody regardless of its direction!

#### SOME ADVISES FOR THE BEGINNER'S CANOE TECHNIQUE:

- Basic Position: keep a modest vertical kneeling position on a very low kneepad. If the bodyweight is closer to the water it produces a lower centre of gravity resulting in more stability and balance. Use mainly arms for paddling to start with.
- Do weak, short strokes using the arms; keep the body still without big movements.
- Focus on the balance, reducing the pressure on the paddle and push the boat forward to the paddle.
- The steering should be an extra part of the stroke. Gently contact the paddle with the boat gunnels turn the blade away from the boat in a capital J motion. Keep the paddle in the water until the boat returns to the requires direction of travel.

#### EXERCISES:

- Sit in and out a kayak
- Kneel in a canoe
- Forward strokes by hands in kayak
- Back strokes by hands
- Controlling and steering stable canoe
- Side strokes
- Feathering

#### SUMMARY QUESTIONS:

- Demonstrate and describe the proper kneeling position
- Demonstrate and describe the “J” strokes
- What is the best angle of the paddle at the entry
- At which position of the paddle should “make” the J stroke in normal condition
- What a paddler can do in the condition of strong “bad-side” wind

## 5.6 ACTIVITY EXAMPLES

These activities help develop Balance, and Paddling Technique:

- Paddling a certain number of strokes with eyes closed.
- Kayak Paddlers, paddle with both feet out of the cockpit and in the water. Canoe Paddlers put only the front foot out of the boat and in the water.
- Paddlers align their boats parallel to a motor boat wake and paddle through the waves as they follow the motor boat.
- Paddlers on the dock (seating or kneeling position) adjacent to the water, learn and practice the feathering stroke. Have each paddler practice putting as much weight on the paddle as possible while feathering and without falling in the water.
- For Canoe, learn and practice the “J” stroke on the dock. Paddlers will take a forward stroke. At the end of their stroke, while the paddle face is still fully submerged, the paddler will draw the tail of a “J” away from the boat with their paddle.
- Learn and practice the draw stroke on the dock.
- Throw a “target ball” to the water. Paddlers must paddle to it and need touch it with the nose of the boat.
- Obstacle course that incorporates as many paddling skills as possible.
- Mini triathlon (running, paddling, running (or swimming) over a pre-determined distance.
- To paddle to a marker and back in a designated time.
- Paddle a designated distance while pausing 3 to 5 seconds between each stroke holding the paddle in the air.
- Kayakers paddle while holding the paddle in as wide a grip as possible.
- Playing a kind of Canoe Polo by passing and catching the ball to each other





# CHAPTER 6

## PHYSICAL CONDITIONING

The technique, the physical condition and the physiology of the paddler are the determining factors for Canoeing.

While the performance of canoeing is heavily dependent on the technique the sport is mainly a power endurance activity. Therefore the muscular strength and endurance of the athlete play important roles in determining competitive success.

The two main parts of the human physiological system are:

- Cardio respiratory system (Endurance factors)
- Energy supply (Supports the function of the Circulatory system).

In this Coaches Level 1 part we will only discuss the cardio respiratory system, which is responsible for endurance of an athlete.

For any movement of an object appropriate force is required to overcome inertia and gravity. The speed of a boat requires suitable strength of the athlete to move the boat forward. Therefore, muscular strength also plays an important role in canoeing.

### 6.1 ENDURANCE AND ENDURANCE DEVELOPMENT

#### DEFINITION:

Endurance or stamina is defined as the resistance of the organism to sustained physical activity. ‘Stamina is the adaptation of the circulatory and respiratory systems to sustain exercise work loads and the capacity to resist fatigue.’

The most important aspect of developing stamina lies in the athlete’s respiratory and cardiovascular systems. The respiratory system is responsible for breathing and oxygen supply. The cardiovascular system transports oxygen and fuel to the muscle and removes by-products.

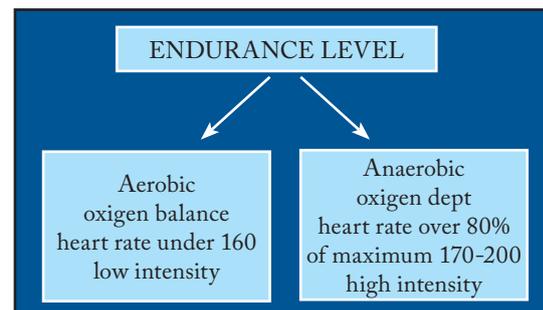
Since the duration of a race in Canoeing can be from 30 seconds up to 3 hours long distance training and endurance need to be developed as they represent the most important elements for canoeing success.

Depending on time periods, endurance may be classified for Canoeing as:

SHORT TERM	40 seconds to 2 minutes
MEDIUM TERM	2 to 8 minutes
LONG TERM	over 8 minutes

Regarding to the duration of the canoeing Olympic distances the well-developed short and medium term endurance are most necessary to improve.

As a result of endurance development training the oxygen utilisation can be improved. The muscle’s oxygen supply increases, which mean the works, can be sustained on higher intensity by aerobic energy.



Generally, we speak of two types of energy systems: Aerobic and anaerobic energy

#### AEROBIC ENERGY

This system is activated when all the energy is supplied by oxygen during sustained low intensity exercise. There is an oxygen balance between demand from the muscles and supply by the cardiovascular system which meets the workload for long durations.

At low intensity rhythmical physical activities, where the heart rate per minute is between 120 and 150, the aerobic energy system is able to meet the demands of the activity

Aerobic capacity is defined as the maximum amount of energy that can be produced in a specific time unit. This is measured by the amount of oxygen consumed by the body. (This level can be tested by the VO2 Max capacity.)



## Chapter 6 – Physical conditioning

- 6.1 Endurance and endurance development
- 6.2 Strength

### ANAEROBIC ENERGY

Anaerobic energy sources operate when the body is working at high intensity levels which results in a demand for oxygen that can not be met by the aerobic energy system. This results in “oxygen debt” which causes the build up of lactic acid in the muscles and blood, which leads to fatigue. The heart rate for anaerobic activities are typically above 170 -180 beats per minute up to the maximum of the individual.

(The maximum individual heart rate can be calculated from 220 minus the age of the person)

Both aerobic and anaerobic energy systems are important in Canoeing.

Each athlete will have their own threshold level, which is about 80% of the maximum heart beat /minutes and could improve during endurance development training.

### ENDURANCE TRAINING

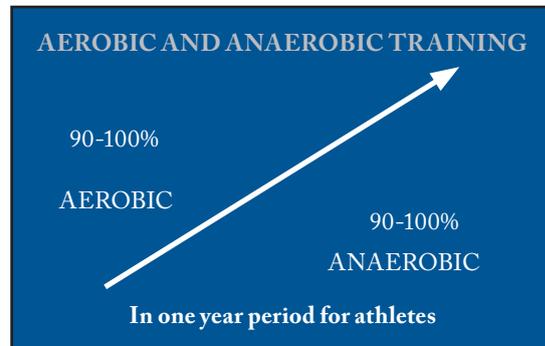
Improving and maintaining endurance for Canoeing is a continuous task. Endurance capacity decreases quickly with inactivity whilst on the other hand continuous regular training can improve endurance capacity.

The best way to improve endurance is specific paddling as well as supplementary training such as running, swimming, bicycling, cross country skiing or speed skating. You will notice these are all rhythmical long duration activities (minimum of 20 minutes duration). Although specific training is considered more important, supplementary training will provide a developed cardiovascular system as a strong base. It is beneficial to use supplementary training as well as the specific training.

To increase endurance capability the first task is to develop the aerobic energy capacity and secondly the anaerobic energy system. This order of progression is very important for training of beginners but also for the seasonal training of advanced athletes where peaking for certain events is important and is affected by the fitness of the athlete.

*Aerobic and Anaerobic Training*

Age	Aerobic Endurance	Anaerobic Endurance
10-13	90% / 80%	10% - 20%
14-15	80% / 70%	20% - 30%
16-18	70% / 60%	30% - 40%
Seniors	50%	50%



### ENERGY DEMANDS

An athlete needs “fuel” to have energy to complete the training and competition requirements. Coaches and athletes should be aware of the basic nutritional needs for sport. A good healthy balanced diet is including carbohydrates, fats and protein. Athletes should consume plenty of water daily (3-4l) to ensure hydration of the body is optimal at all times.

## 6.2. STRENGTH

Muscular strength is a very important element of canoeing in terms of determining the speed of the boat. The direct correlation between strength and speed is a well known fact. Without good physical strength successful Canoe racing is not possible.

Strength is generally defined as the ability to exert force to overcome a resistance (e.g. gravity or moving an object). The force of a single kayak stroke is approximately between 16 - 25 kilograms and 20 to 30kg in a canoe, depending on experience and gender.



## Chapter 6 – Physical conditioning

### 6.2 Strength

### 6.3 Strength development

Most strength is needed at the start, later the force drops to approximately 20 kp in a kayak and 25 kp in a canoe per stroke.

To provide continuous propulsion the stroke rate must be repeated approximately 40 to 80 times per minute whilst canoeing and 70 to 170 strokes per minute whilst kayaking subject to the athlete ability. The force exerted and the stroke rate (speed) will determine the overall power generated by the paddler which ultimately determines the speed of the boat in the water. Therefore, in order to sustain boat speed, the strength endurance of the athlete must be maintained to keep a high power output during the sport session.

Strength development should occur in parallel with the specific sport training methods from the very beginning of a paddler's career. Of course the athlete's constitution, physical and mental traits and his/her age must be considered in composing these routines.

There are different kinds of muscular strength:

- **Maximum strength** (A one off movement)
- **Strength endurance** (Sustained heavy physical exertion over a period of time)
- **Explosive strength** (this is technically power not strength which generates speed of motion as described earlier).

#### MAXIMUM STRENGTH

Maximum Strength is the ability to exert maximum force against a resistance to overcome it. Maximum strength plays the most important role at the start of a race when the boat must be accelerated from zero to a maximum speed in the shortest possible time. Experience shows that stronger paddlers start better than weaker ones with equal technical ability.

Another factor is the proportion of maximal strength required for each stroke as this determines the speed of the onset of fatigue. Generally, stronger paddlers can maintain an optimum stroke rate with a larger blade or longer paddle which will result in higher speed than weaker paddlers.

As stated earlier the maximum strength in a stroke depends upon the technique and the ability of the paddler to transfer that strength into power to propel the boat forward.

#### STRENGTH ENDURANCE

Strength endurance determines the athlete's ability to resist fatigue over time. It is also vital that the expended power for each stroke does not diminish during the course of a race. Therefore, strength endurance is key to paddling.

#### EXPLOSIVE STRENGTH

Explosive strength is needed primarily at the start of the race but can also help the athlete to accelerate the speed of the boat by increasing the athlete's stroke rate during different strategic phases of the race. Explosive strength is indispensable for 500 and 200 meter events.

All three types of strength are essential components of the paddler's physical profile. Each contributes to the good execution of parts of a race so we must develop all three types of strength simultaneously.

## 6.3 STRENGTH DEVELOPMENT

#### MAXIMUM STRENGTH DEVELOPMENT

Maximal strength requires high load and low number of movements.

There are two different concepts for Maximum Strength Development:

- a) High or maximum loads: Loads are 80% to 100% of maximum strength. Number of repetitions is usually in a descending pyramid style starting from 12 or 10 repetitions per set to 2 or 4 repetitions per set whilst simultaneously increasing the loads lifted (E.g. 10, 8, 6, and 4 repetitions for one exercise). Total sets per training should be 20 to 30 with up to 4 sets per exercise. [I don't understand this last sentence].



- b) Sub maximal loads, 60-80% of maximum strength.  
Execution: Larger number of repetitions to over exert the muscles. The number of repetitions is usually between 10 and 16 per set.  
The number of total sets is usually between 25 and 30, 4 to 6 sets for each exercise.

*Note: Weight training exercises should be executed using suitable techniques which do not risk injury.*

**Progression:**

- a) The load must be increased periodically across training sessions to increase resistance and continue the muscle development.
- b) Within the weight training programme the proper recovery time is important. It should be 90 seconds to three minutes between the sets and 36 to 48 hours between two sessions.

**EXAMPLES FOR MAXIMUM STRENGTH DEVELOPMENT**

**“A”**

No of exercises: 7

No of repetitions: 10

No of sets per exercises: 4

No of total sets: 28

Load: 80% of the maximum ability

Exercises: e.g. bench press, bench rowing, one arm pulls, seated shoulder press, dead lift, bent over rowing and dead lift, dumbbell fly and triceps curls

**“B”**

Number of exercises: 6

Number of repetitions: 12 – 10 – 8 – 6 – 4 – 12

Number of sets per exercises: 6

Total number of sets: 32

Loads: (increase/decrease) 70% - 80% - 85% - 90% - 95% - 70%

Exercises: e.g. Flat bench press, bench row, bicep curls, pull ups, chest pull over, barbell shrugs, dumbbell seated press.

**STRENGTH ENDURANCE DEVELOPMENT**

Strength endurance is a combination of aerobic and anaerobic energy sources. The use of each source depends on the workload and the required oxygen supply for the body to maintain the output.

This development involves training at a lower intensity, approximately 30 to 60% of maximum loads.

A high number of repetitions are necessary: 15 to 60 per set. The total number can be 100 to 300 repetitions per exercise in one training session.





## Chapter 6 – Physical conditioning

### 6.2 Strength

### 6.3 Strength development

Execution: continuous movement at optimal or slow speed.

The rest between the sets can be 30 seconds - 2 minutes; between sessions 6 to 24 hours.

#### EXAMPLES OF ENDURANCE STRENGTH DEVELOPMENT

Applied resistance should not exceed 60% of the athlete's maximum strength. The primary characteristics of these training programmes are the high number of repetition with short rest periods.

The training methods for strength endurance developments are:

#### CIRCUIT TRAINING

Any number of stations and exercises can be included in one circuit with varying rest periods between stations.

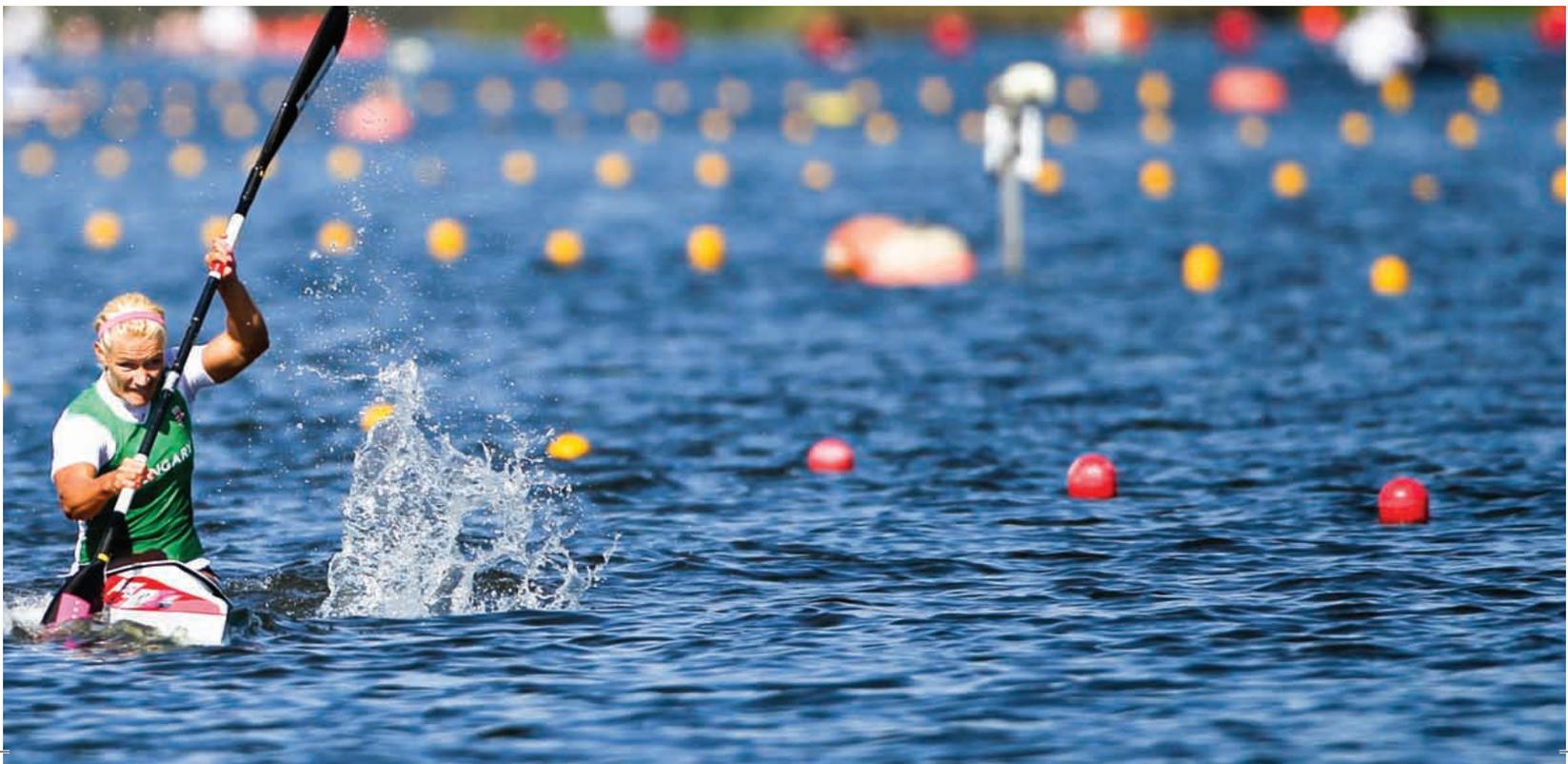
In a continuous circuit defined repetitions and/or the time to complete the exercise (eg.1 minute). The coach must keep in mind that certain exercises may take twice as long than others which may result in congestion (E.g. 10 pull-ups take half as much time as 10 leg lifts). Generally speaking, the same number of athletes can participate in a circuit as the number of stations it contains. It is also practical to design many different kinds (6 to 20 stations) of exercises, to avoid monotony

and engage several different muscles during the workout. A well-designed circuit session can be 20 to 40 minutes long. To design circuit training the following components should be considered:

- number of stations
- kind of exercise
- number of repetitions or time allocated
- loads
- resting and recovery time
- total training time

An example of circuit training by defining the length of each station and resting time:

Work period (in seconds)	Rest period (in seconds)
15	15
20	20
20	10-15
25	15-20
25	20-25
30	25-30
30	10-20
45	15-30





## Chapter 6 – Physical conditioning

### 6.3 Strength development

### 6.4 When to exercise and how much

The described exercises can also be scheduled to be all done in 30 minutes, or specify 6 complete circuits as one complete session. Circuit training can be completed without defining a rest period but by using the total time of training. In that case the athletes can work on pre-determined number of repetitions (e.g. 15 reps on each station) or one main exercise can lead the circuit (e.g. the “leader station” is pull ups where the required reps are 20. The athlete at this station should say “change” so that all athletes move to the next station.

#### EXPLOSIVE STRENGTH DEVELOPMENT

The required type of training is the following:

Load intensity: 50%-70% of maximum strength

Repetitions: 6 to 12 per set, number of sets 4 to 6

Total number of sets is 30 to 40 per training session.

Each exercise is executed at maximum speed without being dangerous. The rest between the sets is 2 to 5 minutes depending on athlete's fitness. The rest between the training sessions should be 24 to 48 hours.

#### EXAMPLE FOR EXPLOSIVE STRENGTH DEVELOPMENT:

Select 5 different exercises e.g.

pull ups:	15 repetitions
bench press:	load 60% -” reps: 15
bench row:	load 60% “ reps: 15
sit ups:	15 repetitions
Rope curls:	load 60% reps 15

No of sets per exercise is: 4 to 6.

The target to finish one set as quickly as possible. (It can be measured with a stop watch and recorded) Between sets the rest time could be 30 seconds to 2 minutes.

## 6.4 WHEN TO EXERCISE AND HOW MUCH

The coach must consider the athlete's physical ability and their age. Whilst the athlete is still growing weight resistance exercises should be kept to a minimum. [This is controversial Csaba. Most, (not all) would agree that weight training

before puberty is not recommended, but once they reach puberty then the hormonal changes associated with puberty contribute to the response to training. Individuals still grow for many years after puberty so you might re-word this] Beginners should only use those exercises which utilise the athlete's body weight or gravity as resistance.

Between the ages of 16 - 18 gradually the intensity of the exercises can be increased and weight bearing exercises added more and more to the programme.

Strength development exercises constitute between 30% and 50% of training.

Strength development training should be held 2 to 4 times a week. It requires rest time between strength training sessions of at least 32 hours for the same body muscle group. Strength and cardiovascular endurance should be trained simultaneously in a weekly program.

Male and female athletes should have training programmes adapted to suit their body types, their age and their athletic ability.

#### WARM UP AND STRETCHING

Warming up and cooling down is the first and last part of every training session. Stretching should be part of all workouts.

#### PRACTICE

##### Prepare and organise strength training for 10 athletes:

- Maximum strength training
- Strength endurance development training

#### SUMMARY QUESTIONS:

- What physiology system can be developed by endurance type of training
- What is about the heart rate at aerobic training
- What is about the heart rate at anaerobic training
- Aerobic or anaerobic type of training suggested for children
- Which kind of strength is important for canoeing
- Heavy or lighter resistances need for endurance strength development

**HODY:** just add water

*2011* 



MK-1  
MK-2  
MK-4 **dolphin**



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# CHAPTER 7

## BASIC TRAINING METHODS

### 7.1 WHY TRAINING IS NECESSARY?

Canoe sport requires regular physical training all year round in all weather conditions.

The purpose of physical training is to increase the athlete's physical, mental preparation for competition whilst also perfecting the techniques for the sport.

The fundamental physical requirements of Canoeing are:

- Endurance or stamina
- Muscular strength (maximum, endurance and explosive)

In addition, it is necessary to improve the athletes:

- Paddling Technique
- Stroke rate of the paddling
- Mental preparation for competition (readiness, psychological preparation)

All or most of the mentioned elements to be a successful athlete are closely correlated.

A serious athlete must train regularly with a balanced training program.

Although canoe training is an individual matter, training in groups is more economical and provides the necessary motivation and competitive elements for athletes that replicate real competition environments. The athletes race against each other daily resulting in the training being more intensive. The athlete can visualize their training adaptations compared to other athletes.

The basic training methodology has its own principles, which are based on scientific research and practical experience. The coach and the athlete should be active and work together in the development of training programs.

All-round physical preparation is an essential part in the development of athletes although canoeing specific training will become gradually more important as the athlete becomes more proficient.

### 7.2 TRAINING, LOADS, FREQUENCY AND METHODS OF TRAINING

Recommended training frequency for various age groups is shown below:

*The suggesting number of training*

Required numbers of training			
Age group	Age	Number of training/ week	Hours of training/ week
Juvenal	10-14	3-5	8-12
Junior	15-18	6-10	14-20
Senior	18-	10-14	20-30

*Training targets*

Required numbers of training			
Age	Training I.	Training II.	Training III.
10-12	aerobic endurance	technique	
13-14	aerobic endurance	technique	strength
15-18	aerob and anaerob e.	speed endurance	strength
18+	anaerob endurance	speed	strength

#### TRAINING LOAD

Change name in table above to child from Juvenal to Juvenile. Should read... "Number of Training Sessions per week".

Paddling is a physically and physiologically demanding sport. Improvement requires an appropriate number of training sessions at a determined intensity. The training load consists of the quantity and quality of training.

Quantity means the time of work (duration), the distance of work and the number of repetitions etc.

Quality refers to the intensity exerted in the training session such as speed, stroke-rate, heart rate and poundage etc.



## Chapter 7 – Basic training methods

### 7.2 Training, loads, frequency and methods of training

*Required number of Training per week*

Required numbers of training			
Level	Nuber of training/ week		
	paddling	strength	running
Beginners up to 2 years	2-3	2	2-3
Advanced 2-4 years	6-8	3	3

In training camps 3 sessions of shorter duration per day are recommended. (For example, two paddling training, one running or one strength development session daily.)

It is beneficial to plan combined or “cross” training sessions which consist of having different forms of exercise within one session. This is especially useful for those who are not professionals and cannot train every day.

*Paddling Volume per Year (average)*

Age	km
12	1.600
13	1.800
14	2.400
15	3.000
16	3.600

*The required paddling distances*

Level	Distance of paddling in km (average)			
	1 day		1 week	
	kayak men	women kayak and canoe	kayak men	women kayak and canoe
Advanced age: 15-18	14-20	12-18	80-120	70-100
Pro athletes	24-40	18-30	160-220	140-200

#### TRAINING METHODS

Most of the methods in Canoeing are based on empirical facts on observations of world-class competitors' performances. The best results were produced with methods

adapted from swimming and running.

The widely used training methods in Canoeing are:

- Long distance or continuous paddling;
- Fartlek (variable intensity training on various distances)
- Repetition; over distance;
- Interval training;
- Cross Training and
- Special training methods, like time trials etc.

*Training Methods*

Training methods	Descr.	to develop	Paddling speed	Heart rate/ min.
Distance paddling	10-40km	aerobic endurance	uniform with 70%-80% effort	130-160
Fartlek	non-stop paddling	aerobic + anaerobic work	varying depends on the programme	120-170
Repetition	short medium longer	endurance and speed	depends on distance of racing speed max. speed	130-180
Defined extra distance	220-230m 520-550m 1050-1100m	endurance speed	close to racing speed	150-170
Interval training	cardio anaerobic specific	anaerobic work speed	varying maximum fast medium	150-max.

In this manual the long distance, Fartlek, interval and Cross training will be explained only briefly.

#### *Remark:*

Kayak and canoe paddling is not a seasonal sport. When paddling is not possible due to weather conditions supplementary sport and exercises are added which should be performed at the same workload and intensity as paddling training.

#### **Long distance training methods**

A long duration workload executed with relatively constant



speed. Long distance training involves paddling 6 to 40km at a uniform speed with approximately 70-80% effort of maximum speed. The regular heart rate should be between 120 -150 beats per minute.

The distance and intensity of paddling may vary with athlete's age or level of expertise. Competition preparation period training or racing season training session will affect the intensity and distance. Why?

This training method is primarily good for the development of aerobic endurance and perfecting technique, including balance and stroke efficiency.

Long distance training is an indispensable part of every paddler's schedule, regardless of the race distance of the athlete. This type of training is very important for beginner paddlers.

**Fartlek training**

Fartlek training or variable intensity (speed play) training method developed in Scandinavia for athletics – Fartlek is a non-stop paddling (or i.e. running or swimming etc.) with different intensities and its durations. Changes of speed can be structured on specific time periods, or as the paddler wishes. It develops the cardiovascular system whilst stressing the body with intermittent heavier workloads. Fartlek training method also aids technical development.

Fartlek training can be held without prescribed distance/ duration of the various intensities. The athlete changes the speed of paddling and its duration as he wishes within he given training volume.

Fartlek training also can be determinate in considering with the higher and lower speed. (See table bellow) This system allows recuperation between the higher and lower intensities.

In more experienced athletes they can amend the Fartlek program to suit their actual fitness levels.

Specifics programmes of farthelek training (examples)

- 1x 1000m hard, 1x 1000m easy
- 1x 1000m hard, 2x 1000m easy
- 1x 500m hard, 1x 1500m easy
- 1x 500m hard, 1x 1000m easy
- 1x 250m hard, 1x 750m easy

**Interval training**

This is the most widely used training method in canoeing. This method consists of paddling a series of set times or distances with controlled rest periods in between. The principle of this method is that the rest interval is long enough for partial recovery, thus fatigue will be delayed. It is imperative the athlete paddles at intensity levels that meet the training objective or goal.

It is essential to establish the working and resting sessions in accordance with the targeted training. See the table bellow.

In the resting time between the working period the heart rate should decrease to 100 -120 beats/min.

The interval training can develop endurance; improve anaerobic capacity, speed and speed endurance with properly planned and executed workouts.

*Working and Resting times in Interval Training*

Intervall training's working and resting times		
Training for	Working times	Resting times proportions
endurance	2-12 min.	1:0,5 or less
speed endurance	30 sec. to 2 min.	1:1-3
speed	7-20 sec.	1:5-10

**Cross training**

Cross training method means there is more than one kind of exercise type in one training session. This method is especially useful for those who cannot train regularly or frequently. It is also a good way to start training for beginners, to gain experience in different training systems. For high-level athletes it can be adapted to provide a very hard training day with aerobic endurance development similar to a triathlon event. See 7.2.3 for more information.



**Examples of Cross Training:**

- *1st session:* paddling and running; (i.e. 10km paddling and 5 km running))
- *2nd session:* paddling and strength development (i.e. 1hr paddling and 30min in gym)
- *3rd session:* running and strength development; (i.e. 6km running and 45 min in gym)
- *4th session:* pool paddling and running or strength development; (i.e. 50 and 40 min)
- *5th session:* combination of three from above the training. (Total time 2 hr)
- *6th session:* Running and swimming (total 1,5-2 hr training)

These combined training sessions will enable the athlete to increase the workloads effectively. It is also a benefit if the locations of the different training are in close proximity to each other.

**Time trials**

Clocking the time for targeted race or other distance is time trials. This is great practice for athletes to learn to race specific distances and showing the actual performance of the athletes. The distance and the time/frequency of the time trials should be determinates in accordance with the annual periodicity.

**SUPPLEMENTARY SPORTS AND EXERCISES**

Kayaking and Canoeing is a seasonal sport in numbers of countries due to climatic limitations. Nevertheless, training cannot cease completely. It is replaced by conditioning which involves complimentary sports and exercises. These activities are vitally important and some are carried over into the training regimen of the outdoor paddling season, such as running, swimming and cycling.

Conditioning is aimed at improving the muscular, cardiovascular, and respiratory systems.

**Complimentary training for endurance development**

**Running**

Running is the easiest form of exercise, requiring no special technique or facilities and is well suited for the

intensive development of the cardiovascular system under almost any condition. Running should start when the athlete becomes serious about Canoeing and should observe the same principles as that of paddling with progressive workloads and intensity. Running should be emphasized during off season workouts starting with 2 to 3 runs per week, and increased to 5 to 6 times weekly Csaba this is for a club runner do you not think its too much for a beginner or young person. Running should also be continued during the paddling season at a rate of 3 times per week.

Running training can be held almost everywhere on any terrain. The training methods can vary including: distance, Fartlek, intervals and up hill running.

*Some examples:*

- 5 to 10 km cross-country,
- 12 min or 3000 meter running (Cooper test)
- Fartlek on track: 10 laps 1 fast -1 slow
- Intervals: 3 x 1200m or 1500m; 4 x 800m

**Swimming**

Swim training can start at a very young age. Due to the uniform resistance of the water swimming develops breathing, cardiovascular system, and efficient oxygen utilisation, similar to the requirements of Canoeing.

Swimming is used primarily in the winter months as a supplementary sport to Canoeing.

Freestyle swimming is the most highly recommended, interspersed with other swimming styles (breaststroke, butterfly and back strokes).

*Some examples:*

- 1000 to 3000 meters per session
- 1 x 1000m
- 1 x 2000m
- 2 x 1500m
- 2 or 3 x 1000m
- 3 x 800m
- 4 x 500m
- Interval training: 10 x 100m rest 2 min; 5 x 200m rest 3 min etc.





## Chapter 7 – Basic training methods

- 7.2 Training, loads, frequency and methods of training
- 7.3 Training zones of paddling

### The paddling tank

Training in a paddling tank or pool is the closest to real paddling. Besides the technique, development strength and endurance development can also be achieved in a well-designed tank. The circulation of the water mirrors on the wall, technical video analysis and physiological testing can significantly increase the benefits of the tank training. Tanks are also a good alternative when weather systems make it difficult to paddle outdoors.

To create a satisfactory movement the blades of the paddle must not be more than 10 -15cm wide, while the length is the same as normal paddling. Even then, a good stroke rate can only be achieved with circulating water.

In a paddling tank it is possible to use modified boats to suit the situation.

Pool paddling workouts can be tailor-made, but the same methods as outdoor paddling can be used.

The Principal of Training for beginner and children

- Make the children to love canoeing/sport
- Teach the proper technique
- Make the training enjoyable
- Endurance development: Aerobic-type training is 80-90% of all training load (paddling, running, swimming etc)
- Strength development: versatile workouts. Use the athlete body weight for exercises.
- Speed/speed endurance development: max 5-10 % of the training gradually

### WARM UPS AND COOL DOWNS

#### Warm Up

A warm up session gets the athlete's mind and body ready to do physical activity.

Some examples of warm-up activities include:

- A short game of football/ basketball, jogging;
- Stretching of large muscle groups: upper body rotations, arm circles and windmills, quadriceps stretch, hamstring stretch, calf muscle stretches, etc.

### Cool Downs

A cool down period allows the athlete's body and mind to recover from practice. A good cool down will help athlete avoid sore muscles the next day. Cool downs are an essential component of injury prevention and should be completed after every practice session.

An example of a cool down is a 5-10 minute leisurely paddle. Try to plan your practice so that your last activity finishes far enough away from the dock that it will take participants 5-10 minutes to paddle back slowly.

## 7.3 TRAINING ZONES OF PADDLING

The intensity or the speed of the paddling can be divided for 6 levels:

- 1) Over racing speed
- 2) Racing speed
- 3) V02 treshold
- 4) Endurance 3 4mm/ ml LA
- 5) Endurance 2 2mm/ ml LA
- 6) Restoration 0mm/ ml LA

### SUMMARY QUESTIONS:

- How many training do you suggest for junior per week?
- How many km paddling do you suggest for men junior kayakers per day averagely?
- What kind of ability could be developed mostly by distance paddling?
- What factors should be determinates by planning interval training?
- What time duration do you recommend for speed development by interval training?



POLARITÁS

# POLARITÁS

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### Data analysis on PC:

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- Speed, acceleration, heart rate, strokerate charts
- Data display synchronized to video
- Drawing of course onto satellite-based map
- Observation of catch, power and release phases
- Training log







## Chapter 8 – The role of a coach

- 8.1 Introduction
- 8.2 Coaching tasks, tools and methods

# CHAPTER 8

## THE ROLE OF A COACH

### 8.1 INTRODUCTION

“Coaches are made, not born” however those who will become successful must have some common sense for teaching others, have good skills in communication with athletes and have an academic knowledge of sports practice.

The primary role of a coach is to guide young people to develop sports skills and racing ability but also to educate them mentally for the proper behaviours, communication and healthy lifestyle.

Coaches have a huge impact on the lives of their athletes as many athletes spend considerable time with their coaches often more than time spent with parents.

Coaches working with children or with athletes at higher level competitions have to understand all aspects of dealing with people in preparation for a sporting event.

#### **The role of children in sports:**

Have fun, make friends, feel good, learn new skills and progress in their performance, and to belong in the sporting group.

#### **The role of the athlete in sports:**

- To achieve high level performance
- Win competitions at various levels
- Community honors, both financially and through respect and acknowledgement. Obtain benefits for their performances.

#### **The role of the coach in sports:**

- Find personal challenges and achieve them.
- Prepare athletes mentally and physically for competition
- Mould successful athletes and help them to win at various levels.
- Gain recognition and acknowledgement in the community,
- Community honors, obtain respect and financial rewards for successful work.
- Contribute to and continue to be involved with the sport.

Coaching can be a very rewarding activity (E.g. financial benefits, pride in accomplishment, see the improvement of the group etc.) but also demands a great deal of time mental & emotional energy and commitment.

Basically every coach wants to do his/her best although every coach has strengths and weaknesses. The coach should know his/her flaws and strengths and try to improve. Coaches help athletes most effectively by capitalising on their strengths whilst addressing weaknesses and making improvements.

Coaches should continuously learn more about the sport and use it to serve the development of the athlete better. A good coach should be open-minded, use the experiences and knowledge to progress/change his methods to reach better results.

Coaches, just like athletes, should improve on a regular basis.

### 8.2 COACHING TASKS, TOOLS AND METHODS

Tasks of the coach include everything connected with the development of Canoeing. The coach will have to undertake many tasks. He should be an instructor, a teacher, a trainer, a psychologist, a disciplinarian, a boat-paddle master, a motor boat and car driver, a manager, an administrator, logistics manager, a scientist and a student of the sport.

A coach should be responsible for:

- Recruitment of paddlers;
- Health and security of athletes;
- Results of the competition;
- Progress of athletes and club results;
- Planning and directing training;
- Discipline of racing rules and athletes;
- Effective organization of tasks connected with the job position;
- Developing and/or condition of facilities and equipment, etc...



## **RECRUITMENT**

As outlined before, for Canoeing the best age to start is 10 to 14 years old because the nerve-muscular system at these ages is able to learn coordination skills quickly. It is physiologically the best age for development of endurance. Starting at an older age can also be successful but generally the coach needs to find talented athletes who are at a high level of physical fitness and whose social position allow them to train.

Usually a coach has to find paddlers for Canoeing and then maintain them in the sport by continually stimulating them and making the sport interesting. The best way is to make good contacts with schools and physical education teachers.

At the beginning a coach can handle 20 to 40 people at the same time (i.e. during one training session) and later the best number for a coach is 6 to 15 talented athletes. The number depends on the athlete's level, sometimes 1 to 4 international level paddlers is sufficient number for one coach.

Before starting the first training session the coach should ask for the novice's medical record, parent's permission to Canoe and test the child's swimming ability.

## **HEALTH AND SECURITY OF ATHLETES**

When working with beginners (not only children), the safety of athletes is most important! Everything else is secondary.

Coaches must always consider health and safety.

Paddlers should wear a life vest or jacket. Water training should be attended by a rescue boat or motor boat.

Teaching beginners means using step-by-step methods to avoid early failure and loss of self-confidence. It is better to progress slowly at the beginning but with more basic and fundamental practices to achieve more gain in the long run and to avoid drop out of children from the course.

## **COMPETITION RESULTS**

Good results are the main and most important requirement from a coach. All the other tasks of a coach are geared towards this objective.

The athlete's results are an indicative measurement of a coach's ability. To have a great athlete is partly good luck but general improvement depends on a coach's work and ability to develop the athlete.

It is not enough to have one successful race, a coach should be responsible for the athlete's progress as well. This means an athlete has to improve year by year, getting faster and faster if he or she follows the coach's training plans and teaching.

If the athletes trained by one coach improve, then the results of a club will improve too.

## **PLANNING AND DIRECTING OF TRAINING**

Suitable training is necessary for the different levels of competition and skill level of the athletes. Good training plans are essential for good results. To make appropriate programs is an art of coaching.

To achieve this it is necessary to have sport knowledge and experience, but the best program itself is not enough, that is only the basis for good work with athletes. Coaches must also enforce the planned training programme. The athletes have to train to reach the required effects to improve their ability which is usually not easy to do. Intensive training is not harmful but it can be painful and to get through it needs a lot of willpower. In addition, coaches need to make training challenging, varied and interesting or else the motivation of athletes will wane.

Coaches have to force their athletes to train at the required intensity because only in that way can they progress. So, the coaches must prepare, lead and motivate during the training sessions.



### **DISCIPLINE OF ATHLETES**

Amongst the athletes of a team, the coach is always the leader, but it's important that the coach reacts fairly and equally when dealing with issues and tasks for the athletes.

Should the coach give orders to the athletes it is more useful to explain to the athletes the reasons why those orders have been given. By making the objectives of the Coach clearer the athlete can see what purpose the task has and can then be motivated to also achieve the objective. Without this communication between the coach and the athlete, the congruence between the coaches and athletes goals is not high and is likely to lead to problems or failed objectives.

As athletes become more experienced the coach plays less of a 'teacher' role and spends less time explaining why and how to do things in the sport. The coach becomes more of a facilitator for the athlete helping to motivate more and slightly adjusting or amending techniques and training programmes to suit the athlete as he/she progresses through the season.

Team spirit and unity can be built by showing a friendly, helpful intimate unit to outsiders. Things like travelling together or wearing the same uniform or T-shirt can help project these feelings.

It is also important to abide by the racing rules, show fair play and honor the judges and officials in the difficult role that they play during competitions.

### **DIFFERENT ORGANISATIONAL TASKS**

A well organised club or team can make technical progress easy. Coaches have to make good connections with athletes, clubs, sports leaders, Sport Federations, sponsors, parents, schools, old-boys etc. in order to keep the society efficient. At competition, the coach needs to be responsible for:

- Athlete entries;
- Travel and boat transportation;
- Board and lodging

- Equipment;
- Training program, timetable and schedule
- Dealing with emergencies
- Problem resolution
- Media requests and opportunities

Organising training camps are also part of the coaches job at various times of the year.

### **DEVELOPING FACILITIES**

Good environment and facilities are basics for successful training and development of Canoeing such as:

- Adequate number of suitable boats and paddles;
- Secure storage place for equipment;
- Coach's and rescue power boat;
- Dock or pontoon for launching and porting the boats;
- Changing rooms and toilets;
- Facilities for strength development;
- Tank or basin for winter paddling or for teaching beginners in cold climates.

The coaches should be responsible for keeping these facilities and all equipment in good condition. The coach should ensure careful and correct handling and use by all paddlers to ensure the long life of the equipment.

### **THE ROLE OF THE COACH FOR TECHNIQUE DEVELOPMENT**

- Provides the paddler with the knowledge, tasks and goals that challenge and stimulate the desire, to paddle technically well.
- Provides the drills, practices and routines to enable the paddler to continuously improve.
- Strives to raise the technical level and understanding of the paddler. Teach technique correctly from the start; bad technique habits will quickly become difficult to change.

*It may only take a few sessions to acquire bad technique but a year to correct it!*



## Chapter 8 – The role of a coach

8.2 Coaching tasks, tools and methods

8.3 Teaching and coaching beginner

It is important that the coach does not overload the paddler with too much information or complex instructions before he/she has mastered the simple early stages of learning. It is important the paddler is not discouraged from wanting to learn to paddle.

### 8.3 TEACHING AND COACHING BEGINNER

One of the great advantages of Canoeing is that it is relatively easy to learn and new paddlers can get on the water quickly (Especially if there are some stable boats available).

Beginners should first be given a general introduction to Canoeing. It is beneficial to take them to a competition, have them observe some skilled paddlers in training and show them videotapes. The main objective is for the novice to gain an overall visual knowledge of Canoeing.

The technical instruction is a two-step process. Firstly, explain the basic physical principles and theories of paddling with ample demonstration, then let the novice paddlers develop his/her own individual movements or style within the framework of the correct technique.



FIG 42 ASSISTANCE FOR LEARNING KAYAKING

The first aim is for beginners to learn co-ordination. The “step by step” training for skills are:

First step: The basics of paddling should first be taught on land, in a paddling tank, on a bench or on a dock

because of the lack of balance it is not suitable to start paddling in a racing boat. Dry land preparation can take 5 to 15 training sessions alongside some water practice. The basic strokes and the orientation of the paddle must be learnt first.

Second step: The beginner uses a stable boat such as a touring kayak or canoe, canoe polo boat, “mini” kayak or team boat. In this kind of boat the novice can gain more self-confidence, before paddling in an unstable racing boat. This practice can take 20 to 40 training sessions.

The third step: is to use the racing boats. Beginners should paddle first in single boats, then in team boats.

#### METHODS OF INTRODUCING AND TEACHING OF CANOEING

- Demonstration in life or DVD
- Verbal explanation
- Start training gradually
- Keep teaching simple
- Communication from positive to negative
- Clear and short instructions
- Evaluation after each training
- Listen for feedback

How fast a beginner can learn Canoeing depends on the talent or in more detail:

- skill
- age
- general limb co-ordination
- sense of balance and confidence
- body composition and personal temperament
- frequency and duration of training
- available water and weather conditions
- coach’s teaching ability

#### TEACHING BEGINNERS THE KAYAK TECHNIQUE

It is important that you begin to teach the rudiments of the kayak stroke on land and not in the kayak, otherwise the beginner will not acquire the correct movements of the kayak technique.



At first it is desirable to practice the basic movements standing. In this phase they have to practice the basic movements of the body trunk and arms and learn feathering (controlling / twisting) of the paddle.

Then, it is more desirable is to sit down on a bench or paddling tank and simulate the proper kayaking movements. Also can be useful to practice the technique to sit on the ground with a 120cm long paddle shaft or tube or using only a stick instead of paddle.



**FIG 43 DRY LAND PRACTICE AND IN THE WATER**

After the dry land practices you should paddle a stable type of kayak than the racing kayak. Another possibility the beginner could sit in a racing K2 alone in the first seat or in second seat behind an experienced paddler. Coach could fix some extra balancing protection as a double outrigger behind the cockpit of the racing kayak.

If the beginner has some confidence and balances it is time for the first stroke in a racing boat. First the seat from the kayak can be removed because in this way the kayak has more balance. The beginner should paddle first only with hands to feel the balance and boat more easily then introduce the first strokes with a paddle. Paddle first without a seat in the kayak later the seat can be added to the boat.

**SUMMARY OF THE STEP-BY STEP TEACHING METHOD FOR KAYAK TECHNIQUE:**

- Dry land exercise
- Paddling in a stable kayak (or in K2, or balanced k1)

- Paddling in a racing K1 by hand without seat
- Paddling in a racing K1 by paddle without seat
- Paddling in a racing K1 regularly
- Paddling in team boats (K2, K4)

The Szanto Method can be used for teaching beginners for technical development or for training session warm ups.

In a seated position with a 1 meter or 1,20m long tube (imitation of a paddle shaft) grab it as a paddle and make the following exercises in order:

- Put the tube on the shoulder and rotate the trunk (body rotation) with the synchronized leg press;
- Do the same movements but this time with the “paddle” in front of the torso;
- Simulation of the strokes separately each side;
- Continuous paddling simulation.

**TEACHING BEGINNERS FOR CANOE TECHNIQUE**

Basically we should follow the same “step by step” method as for the kayak method. The very first time the paddler must decide which side he/she will paddle, on the left or right.

Paddling in canoe is more difficult then in a kayak for the first time. This is due to the higher kneeling position and the lack of rudder to control the direction of the boat. Using proper teaching methods beginners can improve quickly and be able to get over the mentioned extra difficulties within weeks.

In teaching canoeing to young people aged between 12 to 14 years it is important to develop both sides to avoid the disadvantage of the asymmetrical muscular development and the possibility of deformity of the skeleton. The team canoe is an excellent way to paddle on both sides.

For kneeling it is necessary to have or make a kneepad. A well fitting kneepad is essential. For beginners the lower kneeling position is better because the balance is efficient and it provides more stability.



Paddle on a dock or in a paddling tank, a narrow bladed or an opposite side turned paddle is very useful because a normal size paddle requires great force from a motionless place in a stationary position.

After the dry land practices beginners should paddle more stable boats than the racing C1. (There are new C1 designs specifically for children that are stable and light in weight).

Using touring “Indian canoes” or a small fishing boats etc. can help the beginner become more comfortable before entering a C1 boat. First, in a seated position the beginner should learn the strokes and control the boat by the single bladed paddle. Then the paddler practices the paddling in the kneeling position and eventually starts to paddle in a C1 boat.

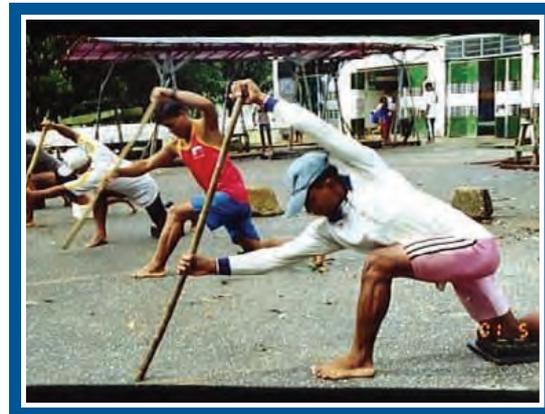
**SUMMARY OF THE STEP-BY STEP TEACHING METHOD FOR CANOE TECHNIQUE:**

- Dry land or from pontoon exercises;
- Paddling in a stable boat in seated position;
- Paddling in a stable boat in kneeling position;
- Paddling in C1 (on low kneepad);
- Paddling in C2

The “Szanto method” can be used for teaching the beginner canoe paddler or for warm up to training sessions.

The exercises require a tube, stick etc. (as an imitation of a canoe paddle shaft). Its size should be approximately shoulder-high to the paddler. Paddlers can pull this tube on the ground in the kneel position using some protection under their knees.

- lean down deep and twist forward to reach a far point at “water catch”
- pull the tube until the knee (exit position) whilst lifting the body trunk up
- paddle continuously, slowly with controlled movement
- add the “J” stroke and correct exit movement to the stroke when competent.



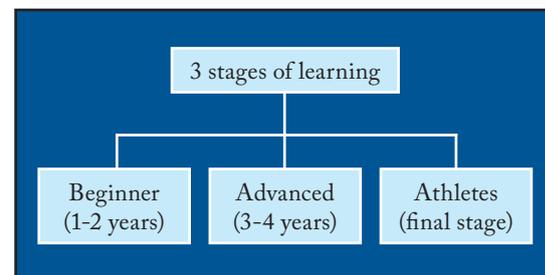
**FIG 44 PRACTICING CANOE TECHNIQUE ON DRY-LAND**

The beginner should learn how to control the boat with the “J” stroke. This requires good demonstration and practice in order for the beginner to master the stroke. Excellent stability, strokes and advanced technique takes many months and often years to perfect.

Learning and teaching order of canoeing technique:

- Stability -balance
- Basic Techniques including strokes and co-ordination
- Single boat techniques
- Team Boat techniques
- Stoke rate progression
- Advanced techniques

*Stages of the athletes progressing*





THE 7 FACES OF TRAINING							
%	Beginners		Advanced		Competitors		
	1	2	3	4	5	6	7
100	Balance	Basic technique	Strength	Strength	Strength	Strength	Strength
50			Aerobic endurance	Aerobic endurance	Aerobic endurance	Aerobic endurance	Aerobic endurance
		Technique	Technique	Anaerobic and speed dev.	Anaerobic and speed dev.	Anaerobic endurance	
				Competitive technique	Speed dev.	Speed dev.	
		Balance	Balance	Competitive technique	Competitive technique	Competitive technique	
Balance				Competitive technique	Competitive technique		

• FIG 45 START IN K2





## Chapter 9 – Introduction to racing

- 9.1 The goal of training is successful competition
- 9.2 Warm-up and stretching

# CHAPTER 9

## INTRODUCTION TO RACING

### 9.1 THE GOAL OF TRAINING IS SUCCESSFUL COMPETITION

For all sports the main goal of training is the successful participation in competition.

It is very important to have the first race in due time. For the novice, these races may appear easy, but they are highly demanding both physically and mentally. So it is important to participate in races compatible with the athlete's level of expertise. It is also important to be well prepared for race both physically and mentally. If the paddlers feel self confident, compete. In the first race whether the athlete can win or not, should not be the determining factor. Winning requires a great deal of experience besides training. The successful competitor should be suitably fit to match the sport enabling anaerobic efficient performance at high intensity work levels combined with good technique and power output.

Those entering into Canoeing at an early age (10 - 12 years) should by all means give 200m or 500m sprints a serious try. It often takes 5 to 8 years of hard training and preparation to develop a paddler of international calibre; thus, this kind of racing favors the young beginner.

Whenever the magnitude of the regatta demands it, the competition is conducted on a buoyed 6 to 9 Lane course where all the racing rules prevail. Therefore, it is important that the athlete and the coach be familiar with the ICF regulations and any other regatta regulations in force for the competition.

Often at races only the start and finish lines are marked and the lanes are imaginary. This „partially set” course demands a high degree of sportsmanship if one is to avoid „wake riding” which can provide you with a great advantage over the other competitors. Sometimes the turbulent water created by the other boats makes you lose your lane positioning.

Canoe and Kayak racing have become highly specialised in respect to racing distances and boat type. There are only a few exceptional athletes who are able to compete successfully on more than one distance or in both single and

double boat events in the same regatta and perform well.

A paddler may have to compete in some event in addition to their specialised event, but this situation calls for special training. The significance of each race may be different to every competitor and winning is not always feasible.

Successful competition requires consistent and high intensity training, a healthy life style and the thorough knowledge of every facet of racing. Therefore we should discuss some of these important aspects of competition.

### 9.2 WARM-UP AND STRETCHING

It is necessary before any training and essential before competition. Ineffective warm-up is often the source of injuries or substandard performance in a race. The warm-up is the toning of the body to enable the athlete to perform with maximum exertion. To this end, blood circulation and pulse rate must be increased with good dilation of the capillaries, which increases the oxygen supply to the muscles.

In cold weather or in the morning and for older people a more thorough warm-up than in warmer weather or in the afternoon is required. The intensity of the warm-up also depends on the distance about to be raced. The 200m and 500m distance require more intensive warm-up than longer distances.

About an hour prior to the start the paddler should begin some moderate activities, such as stretching, jogging-running, gymnastics, checking the boat, the paddle. It is advisable to rub the paddle grip and the hands to make sure they are not greasy or slippery. The next step of the warm up is gymnastics, including stretching and a massage of active body parts. Approximately 20 to 25 minutes before the start, the paddler should get into the boat, paddle slowly for 5 to 8 minutes, followed by an intense 80 to 85% of maximum paddling for 2 minutes. Some slow paddling should follow, again with an even more intense 85 to 90% of maximum sprint paddling lasting about 30 to 40 seconds.



## Chapter 9 – Introduction to racing

- 9.3 The start
- 9.4 The finish
- 9.5 Environmental factors of a competition
- 9.6 Race course

### 9.3 THE START

A well-executed start is indispensable in all races, especially for the shorter distances (E.g. 200m or 500m) where a slow start can lose the athlete the race. Any length of time, even a fraction of a second, lost due to a slow start is a serious physical and psychological handicap that can be difficult to overcome in the remainder of a sprint race. Even on long distance races it is an advantage to gain an early lead over opponents.

The start should be learned only after the novice feels quite confident in the boat. If the paddler has acquired the necessary paddling technique he/she should learn and regularly practice starts. The main purpose of the start is to accelerate the kayak or canoe to its maximum racing speed as fast as possible, without depleting the body's energy for the sprint that follows. Before the start an "aligner" official lines up the boats. This usually requires special dexterity on the part of the competitor, even in case of "held start" when the stern of each boat is held by someone or when a special device holds the boat. The latest system is a mechanism, which holds the boat at its bow, and then together with start command the device rapidly submerges leaving the boat free to move forward. But even with this start mechanism the paddler must know how to back up and be able to keep the boat correctly aligned for the start.

### 9.4 THE FINISH

Approaching the finish line the paddler should be in a position to accelerate the speed of the boat using all their remaining energy to cross the line. Very few athletes are able to increase his/her speed at the finish line if they have paddled at their highest possible speed during the race.

However, many paddlers use their body swing to reach the finish line and to gain essential millimetres over the other athletes. They drop backwards to secure a final forward push to the boat. This pushing movement often leads to losing balance and capsizing. If the boat capsizes before the finish-line then the result will be affected. A capsize after the finish line does not affect the results.

### 9.5 ENVIRONMENTAL FACTORS OF A COMPETITION

The effects of the environment and weather factors strongly influence the results of an individual. The degree of influence depends on the athlete's ability to adapt, his/her self-confidence, physiological and psychological conditioning, paddling skills and the athlete's experience.

The main factors affecting the environment:

- altitude
- micro climate at venue
- jet leg or sleep deprivation
- unaccustomed cold or hot temperature and humidity
- strength and direction of wind
- quality of water surface, ie. smooth or rough
- depth of the water
- food and drink consumed

### 9.6 RACE COURSE

Canoe Sprint courses can be built on natural or man-made lakes or canals. They should be located in an accessible place where calm water surface is guaranteed.

For races up to 1000 meters the course will be straight and in one direction.

#### MEASUREMENTS:

- **length:** 1000m plus minimum 50 m behind the finish line
- **lanes:** depends on the number of the lanes of the course which are minimum four and up to nine;
- **width of lanes:** 5 to 9 meters but each shall be the same width
- **depth:** 2m (international requirements) or more under all the lanes

The official ICF racing distances are: 200m, 500m, 1000m and 5000m

The water quality should be class 2 (swimming water conditions).

**Marking:** the start and finish line with red buoys with red flags on both sides of the finish line. The lanes are marked with white or yellow buoys or these combinations every 25m (international rule) along the course to help the athlete follow the course during the race.



Plastex Composite is a producer of kayaks, canoes and paddles for racing canoeing, wildwater slalom, paracanoe, dragon boats, tourism and recreation.

Already more than twenty years we supply excellent athletes and other customers with our equipment. Plastex Composite was the only supplier of boats for such important competitions as Olympic Games in Sydney (76 boats), Asian Games in Korea (89boats), Iran (245 boats) and Qatar (74 boats), All Chinese Championships (100 boats). We also delivered boats for many World Cup's and Championships and Olympic Games in Beijing. We deliver boats for Olympic Games in London 2012.

Since many years we are supporting ICF with more than 100 rental boats yearly. Up to date, only during Olympics Games, the competitors won 45 medals in Plastex boats. We support and cooperate with many federations and we are sponsor of Hungarian Canoe Federation.

For most of the competitors the possibility to win a medal is usually the payoff of many years of hard work. However being the best athlete is not longer only the effect of that; in most events the winners also have the support of the very best sport equipment. For this reason our models has been constantly optimized and improved.

The era of boats which were made of wood definitely ended in 1999 when the last project of Struer shapes couldn't win with the new Plastex boats made from composites.

It was the beginning of innovative designs. The appearance of such boats in Plastex offer resulted in changing of ICF rules in 2000.

New shapes of boats – all designed by Ryszard Seruga, were developed on the way of modifications of our existing designs supported by CAD (Computer Aided Design) system and the forms of new kayaks and canoes were prepared with CNC (Computer Numerically Controlled) technology.

Recently introduced, so called "Fighter" line of kayaks and canoes is characterized by a new trapezoid geometry of the hull and double broken bows, improving such parameters as total and wave resistance, stability, balance and easy trimming at every speed.

There is a range of shapes allowing choosing the appropriate boat for the competitor, taking into consideration his mass, paddling technique, distance or weather conditions.

In cooperation with the Ship Design and Research Centre we checked all models appearing on the market and we know that our research is going in the right direction. We registered all our latest models of kayaks and canoes which are more and more successful.

We must admit that this is a great pleasure and satisfaction to watch the winning style of Nicole Reinhardt, Yvonne Schuring / Vicki Schwarz, Piotr Siemionowski, Marek Twardowski, Vadim Menkov, Sebastian Brendel, Valentin Demyanenko, Dzianis Harazha, Ivan Shtyl, Jevgenij Shuklin, Vladimir Fedosenko, Tommek Wylenzek / Stefan Holtz, Lazar / Michalaci, K-4 women from Belarus, and many, many other – just to mention the champions of last year.

But of course our previous models are available (Midas, Olympic Warrior) which are the best for some athletes as we could see in competition results. Plastex also offers a service that meets the expectations of our athletes at all major events – World Cups, European & World Championships (Junior and Senior), Olympic Games.

Since last year we are involved in organizing our training venues in Milfontes (Portugal), Sabaudia (Italy) and Antalya (Turkey) offering good facilities and prices where our equipment can be used and tested.





**Appendix 1 – Training programme**  
3 weeks Training Programme example  
for advanced athletes at age 13-16

# APPENDIX 1

## 3 WEEKS TRAINING PROGRAMME EXAMPLE FOR ADVANCED ATHLETES AT AGE 13-16

*Typical training programme in September*

Mon	Tue	Wed	Thu	Fri	Sat	Sun
12 km paddling	16 km paddling	8 km paddling with brake	2x 2000m paddling time trial	8 km paddling for time	20 km paddling long distance	20 km walking trip
150 pull up's	3x 1000m running	Paddling: 2x 2 min 3x 3 min 1x 4 min 1x 6 min rest 1:1	200 push up's 100 pull up's 10x rope climbing	Running: 1x 1600m and 1x 1200m and 1x 800m		
30 min soccer						

*Usual programme in Off Paddling Season*

Mon	Tue	Wed	Thu	Fri	Sat	Sun
10 km running	800m int. swimming 90% and 4x200m for time	5x800m running	12x100m swimming	10 km running and 30 min strength training	45 min pool paddling	rest
50 min circuit weights training	PM	200 pull up's 200 push up's	PM		300m swimming warming up, then 20x100m	
	45 min soccer		1 hr in gym various exercises plus 30 min and games			

*Usual programme in Racing Period*

Mon	Tue	Wed	Thu	Fri	Sat	Sun
AM	AM	AM	AM	AM	AM	AM
8x1 km fartlek 250m hard - - 250m easy	interval training 2x2:20m r: 2:30m 2x3:15m r: 2:30m 2x 1:25m r:2:30m 2x2:30m r:2:30m	interval, 5x30 sec, 4x45sec 3 x60 sec	10km individual	interval. 3x1min 3x 1,30 3x 1.10 3x 1min	2x3:30 min 3x2:15 min 2x3:30 m  rest: 2m	3x500m time trial  rest 15m
			5x400m running			
PM	PM	PM	PM	PM	PM	PM
2x2000m paddling	Team boat practice	3x2000 m time trial	interval 2m - 3m - 4m 5m-4m -3min Rests: 1m	10km individual	2x 1000m time trial  rest 20min	off
3x 1200m running	1x3 m increased pace 1x5 m increased 1x4 m increased and 3x1m and 2x2m 2x 45 sec	150-200 reps. pull up's and push up's	Game 30min	Game 30min		



# APPENDIX 2

## TYPICAL TRAINING PROGRAMME FOR ATHLETES AT AGE 10 TO 12, 13 TO 15 AND 16 TO 18 IN 4 DIFFERENT PERIODS

### ONE WEEK TRAINING PROGRAMME FOR 10-12 YEAR OLD ATHLETES

#### *1. Basic Preparation Period in Off Season*

	AM	PM
SUN	off	off
MON	off	Pool paddling 6x 7min /4min rests then 100 pull-ups and 100 push-ups
THU	off	Running 4km then strength dev. with circuit training 45min
WED	Swimming: 3set 500 m free style	General conditional indoor training 1,5 hr; gymnastics, heavy-ball and games
THR	off	Pool paddling 10x 5min /2min rests then 120 pull-ups and 120 push-ups
FRI	off	General strength development: 1,5 hr. Included 30 min circuit training
SAT	Swimming: 5x400 m free style	off

#### *2. Special Preparation Period (paddling season)*

	AM	PM
SUN	off	off
MON	off	Paddling 6km (technique) then 4x800m running with 5 min rests
THU	off	Paddling 8km technique and individual strength development
WED	Swimming 3set: 300m-200m-100m-50m	Paddling 6-8km included 3x 5min hard pace then Game
THR	off	Paddling: 8km technique and strength dev. 40 min circuits training
FRI	Paddling 6km Technique with 6-8 times increased pace	Paddling 8km technique then running 6km for time
SAT	off	off

#### *3. Racing preparation period*

	AM	PM
SUN	Race	Race
MON	Paddling 6km technique then push-ups, pull-ups and seat ups	Paddling 6km (technique) then 4x800m running with 5 min rests
THU	Paddling 6x3minutes /1,5 min rests	Paddling 6-8km medium pace/technique, then strength development: push ups and push ups 100-100 reps
WED	Paddling, 6x200m 100%	Paddling 6km technique
THR	off	Paddling 8x1,5 min increasing paces as 80-90-100%
FRI	Paddling 6km Technique with 6-8 start exercises	off
SAT	Race	Race



**Appendix 2 – Training programme**  
 one week Training Programme  
 for 13-15 year old athletes

**ONE WEEK TRAINING PROGRAMME FOR 13-15 YEAR OLD ATHLETES**

*1. Basic Preparation Period in Off Season*

	AM	PM
SUN	off	off
MON	off	Running: 4x1200m for time, rests 5min and 30min circuit training
THU	Swimming 3x500m free style and 3x200m medley	Pool Paddling: 5x4 min rest: 3 min and 5x3 min with increasing pace
WED	off	Strength Development with various exercises, i.e. Gymnastic, heavy-ball and Game 30min
THR	Swimming 3x (100m - 200m - 300m - 200m) free-style	Running: 6 km for time
FRI	Strength endurance development 45 min	Pull Paddling 45 min and strength development 45 min
SAT	cross-country running 10 km	off

*2. Special Preparation Period (paddling season)*

	AM	PM
SUN	off	off
MON	off	Paddling 10 km technique and running 6 km
THU	Paddling 6km technique	Paddling 10-12 km and 40 min strength development training
WED	Swimming 5x400m and 4x100m free style	Paddling 12 km constant pace with brake and running 3x1200m
THR	paddling 6-8km technique	Paddling 14 km, included 5x4 min hard pace and Game
FRI	off	Paddling 10-12 km constant pace and individual strength development
SAT	Paddling 18-20 km	off

*3. Racing preparation period*

	AM	PM
SUN	off	off
MON	Paddling 10 km technique	Paddling: 2x6km for time 20min rest, and game 30min
THU	Paddling 8-10 km technique included 6x2 min hard pace	Paddling: 14km 10x3min the last 30min 100% int and 200-200 pull and push ups
WED	Paddling: 10 km included 20x1 min hard pace with 2min rests	Paddling 3x2000m time trial and running 4x1200m
THR	Paddling 10 km individual	Paddling 16km 3set (2min-3min-4min-2min) and strength training 30min
FRI	off	Paddling 5x 1000m with increasing speed
SAT	Paddling long distance 20 km included 8x 3min with increasing speed	off



**Appendix 2 – Training programme**  
one week Training Programme  
for 10-12 year old athletes

**ONE WEEK TRAINING PROGRAMME FOR 10-12 YEAR OLD ATHLETES**

*1. Basic Preparation Period in Off Season*

	AM	PM
SUN	off	off
MON	off	Pool paddling 6x 7min /4min rests then 100 pull-ups and 100 push-ups
THU	off	Running 4km then strength dev. with circuit training 45min
WED	Swimming: 3set 500 m free style	General conditional indoor training 1,5 hr; gymnastics, heavy-ball and games
THR	off	Pool paddling 10x 5min /2min rests then 120 pull-ups and 120 push-ups
FRI	off	General strength development: 1,5 hr. Included 30 min circuit training
SAT	Swimming: 5x400 m free style	off

*2. Special Preparation Period (paddling season)*

	AM	PM
SUN	off	off
MON	off	Paddling 6km (technique) then 4x800m running with 5 min rests
THU	off	Paddling 8km technique and individual strength development
WED	Swimming 3set: 300m-200m-100m-50m	Paddling 6-8km included 3x 5min hard pace then Game
THR	off	Paddling: 8km technique and strength dev. 40 min circuits training
FRI	Paddling 6km Technique with 6-8 times increased pace	Paddling 8km technique then running 6km for time
SAT	off	off

*3. Racing preparation period*

	AM	PM
SUN	Race	Race
MON	Paddling 6km technique then push-ups, pull-ups and seat ups	Paddling 6km (technique) then 4x800m running with 5 min rests
THU	Paddling 6x3minutes /1,5 min rests	Paddling 6-8km medium pace/technique, then strength development: push ups and push ups 100-100 reps
WED	Paddling, 6x200m 100%	Paddling 6km technique
THR	off	Paddling 8x1,5 min increasing paces as 80-90-100%
FRI	Paddling 6km Technique with 6-8 start exercises	off
SAT	Race	Race



**Appendix 2 – Training programme**  
 one week Training Programme  
 for 13-15 year old athletes

**ONE WEEK TRAINING PROGRAMME FOR 13-15 YEAR OLD ATHLETES**

*1. Basic Preparation Period in Off Season*

	AM	PM
<b>SUN</b>	off	off
<b>MON</b>	off	Running: 4x1200m for time, rests 5min and 30min circuit training
<b>THU</b>	Swimming 3x500m free style and 3x200m medley	Pool Paddling: 5x4 min rest: 3 min and 5x3 min with increasing pace
<b>WED</b>	off	Strength Development with various exercises, i.e. Gymnastic, heavy-ball and Game 30min
<b>THR</b>	Swimming 3x (100m - 200m - 300m - 200m) free-style	Running: 6 km for time
<b>FRI</b>	Strength endurance development 45 min	Pull Paddling 45 min and strength development 45 min
<b>SAT</b>	cross-country running 10 km	off

*2. Special Preparation Period (paddling season)*

	AM	PM
<b>SUN</b>	off	off
<b>MON</b>	off	Paddling 10 km technique and running 6 km
<b>THU</b>	Paddling 6km technique	Paddling 10-12 km and 40 min strength development training
<b>WED</b>	Swimming 5x400m and 4x100m free style	Paddling 12 km constant pace with brake and running 3x1200m
<b>THR</b>	paddling 6-8km technique	Paddling 14 km, included 5x4 min hard pace and Game
<b>FRI</b>	off	Paddling 10-12 km constant pace and individual strength development
<b>SAT</b>	Paddling 18-20 km	off

*3. Racing preparation period*

	AM	PM
<b>SUN</b>	off	off
<b>MON</b>	Paddling 10 km technique	Paddling: 2x6km for time 20min rest, and game 30min
<b>THU</b>	Paddling 8-10 km technique included 6x2 min hard pace	Paddling: 14km 10x3min the last 30min 100% int and 200-200 pull and push ups
<b>WED</b>	Paddling: 10 km included 20x1min hard pace with 2min rests	Paddling 3x2000m time trial and running 4x1200m
<b>THR</b>	Paddling 10 km individual	Paddling 16km 3set (2min-3min-4min-2min) and strength training 30min
<b>FRI</b>	off	Paddling 5x 1000m with increasing speed
<b>SAT</b>	Paddling long distance 20 km included 8x 3min with increasing speed	off



**Appendix 2 – Training programme**  
 one week Training Programme  
 for 13-15 and 16-18 year old athletes

**ONE WEEK TRAINING PROGRAMME FOR 13-15 YEAR OLD ATHLETES**

*4. Racing Period*

	AM	PM
SUN	race	race
MON	paddling 10km, included 4km with brake	6km distance paddling (technique) then 4x 800m running with 5 min rests
TUE	paddling 20x1min, rests: 1,5 min, after 5 reps 3min	paddling 8km medium pace/technique, then strength development: push ups and push ups 100-100 pieces
WED	paddling, 6-8km easy	paddling 6km technique
THU	1x2000m time trial	Paddling 6km, included 10x100m start exercises
FRI	paddling 6km Technique with 6-8 start exercises	off
SAT	race	race

**ONE WEEK TRAINING PROGRAMME FOR 16-18 YEAR OLD ATHLETES**

*1. Basic Preparation Period in Off Season*

	AM	PM
SUN	off	off
MON	swimming 4x600m and 4x100m free style	in hall: 1hr gymnastics, heavy-ball, etc and game
TUE	strength endurance development 1hr	running 8km for time and curcut training 30min
WED	swimming 5x300m free style for time and 3x 200m middley	pool paddling: 5x8 min hard pace, rest: 3min
THU	strength development training 1 hr	running: 5x1200m for time, rests 5min and 30min circuit training
FRI	off	game: 1,5 hr and 150-150 pull up's- push up's
SAT	cross-country running 10km	off

*2. Special Preparation Period (paddling season)*

	AM	PM
SUN	off	off
MON	paddling 8km technique	paddling 14-16km consistent pace and running 6x600m for time and 50 push ups in the rests (5min)
TUE	strength development by circuit training 50 min	paddling 14-16km fartlek
WED	paddling 8km technique	paddling 18-20km consistent and 30min game
THU	strength development by circuit training 60 min	paddling 18km, included 5x 6min hard pace
FRI	paddling 12-14km technique	paddling 10-12km consistent pace and individual strength development
SAT	paddling 20km	off



**Appendix 2 – Training programme**  
 one week Training Programme  
 for 16-18 year old athletes

*3. Racing preparation period*

	AM	PM
<b>SUN</b>	off	off
<b>MON</b>	paddling 12km technique	paddling: 3x2000m time trial and running 6km
<b>TUE</b>	paddling: 5x2,5min rest 1,5min; and 6x1,5min rest 1min	paddling:6x 1000m int 80% the last 100m 100%
<b>WED</b>	paddling: 10km	paddling: 6x500m 90% and strength dev. 30min
<b>THU</b>	paddling 12km technique	paddling 12 km fartlek and Game 30min
<b>FRI</b>	paddling 3set (4-3-2-1 minutes) rest time 1:1, int 90%	paddling: time trial: 1x 2000m, 1x 1000m 3x 200m
<b>SAT</b>	paddling long distance 20km included 8x 4min with increasing speed	off

*4. Racing period*

	AM	PM
<b>SUN</b>	race	race
<b>MON</b>	strength development 1hr individual	paddling: 4x 4min rest 3, and 4x 3min rest 1,5min
<b>TUE</b>	paddling 3x 1000m with increasing speed rests 8min	paddling 2x 1000m for time and 100-150 pull up's
<b>WED</b>	12x1min int 95-100% rest 2min	paddling 2x 2000m for time
<b>THU</b>	paddling individual	paddling 4x 30sec rest 1min; 8x 20sec rest 40sec
<b>FRI</b>	paddling 6km technique with 6-8 start exercises	off
<b>SAT</b>	race	race



### Appendix 3 – Training programme

3 Weeks Training Programme examples for advanced athletes at age 13-16 before a competition

# APPENDIX 3

## 3 WEEKS TRAINING PROGRAMME EXAMPLES FOR ADVANCED ATHLETES AT AGE 13-16 BEFORE A COMPETITION

### Week 1

	AM	PM
SUN	off	off
MON	10 km fartlek with speed up 8-10 times approx. 30 sec	2x 2000m hard pace, rest 10min 6x 100m start exercises strength training
TUE	speed training, int 100% 4 sets (4x 20sec) rest 2min and 5m	speed endurance training, int 95% 10x 1min rests 3min
WED	individual fartlek/ technique (team boat)	time trial 2x the racing distance rest 30-40 min
THU	speed endurance training, int 95% 4 sets (30-45-60 sec) rest 1:3, + 5min	speed training, int 100% 4 sets (10-15-20-15-10 sec) rest 1:8
FRI	3x 300m, int 100% (standing start) rest 8-10min	technique (team boat) practice fartlek with some speed up phases
SAT	time trial 2-3 race course distance rest 30min	easy paddling and strength training

### Week 2

	AM	PM
SUN	off	off
MON	slow interval training 4x 5min with 4min rest, 80%	speed training interval, int 100% 4 sets (15-20-30-20-15sec) rest 1:5 strength individual
TUE	speed endurance training	12 km fartlek
WED	time trial: 1 or 2 course	speed endurance dev. training, int 95% 4x (30-45-30 sec) rests; 1:2 and 3 min strength individual
THU	off	1x 2000m hard pace 1x 1000m and 1x 500m 90%
FRI	speed training int. 100% 2 sets (6x 15sec) rests 2 min and 5 min	aerobic/ anaerobic endurance dev. int 90% 6x 2min rest 3-4 min
SAT	2x 1 course time trial	easy paddling, strength development

### Week 3

	AM	PM
SUN	race	race
MON	fartlek 6km - increasing the pace to the max speed up to 8-10 times	2 km cruising/ technique, + max speed 2 sets; 8x 15sec (or 40 - strokes in K 20 in C) with 1,5 - 2min rest
TUE	1x 1000m or 500m 95% and 6x 100m with flying starts	1x 300m 100% 1x 200m 100% 3x 100m standing start 100%
WED	off or individual paddling	2 sets (4x 1min) rests 2 and 5min intensity 90%
THU	off or individual paddling	speed training 1 set 4x 15sec rest 2min 1 set 6x 10sec rest 1,5min
FRI	6km fartlek	off
SAT	race	race



# APPENDIX 4

## INFORMATION ON CIRCUIT TRAINING

### STRENGTH ENDURANCE Long circuit training (aerobic type)

- Non-stop (20-45 minutes) or
- With determinate working/ resting time (e.g.: 30/ 30sec; 30/ 20sec)
- No of exercises: 10-15 various
- Load: 20-50%

