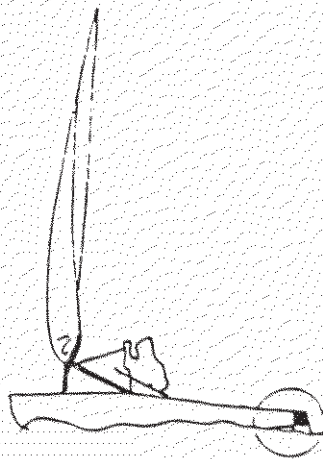
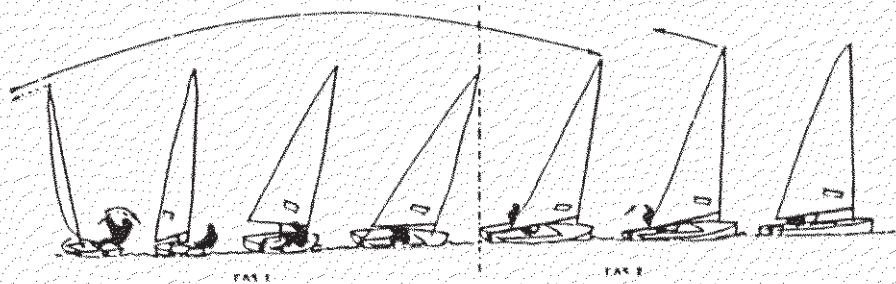
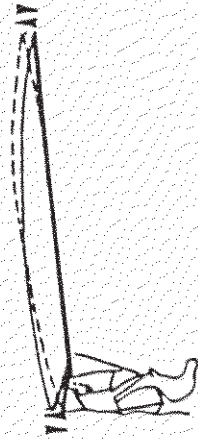


Faster Europe-dinghy sailing

Speed-trim and technique

Written by Anders Larzon



Faster Europe-dinghy sailing

◆ *Speed-trim-and-technique* ◆

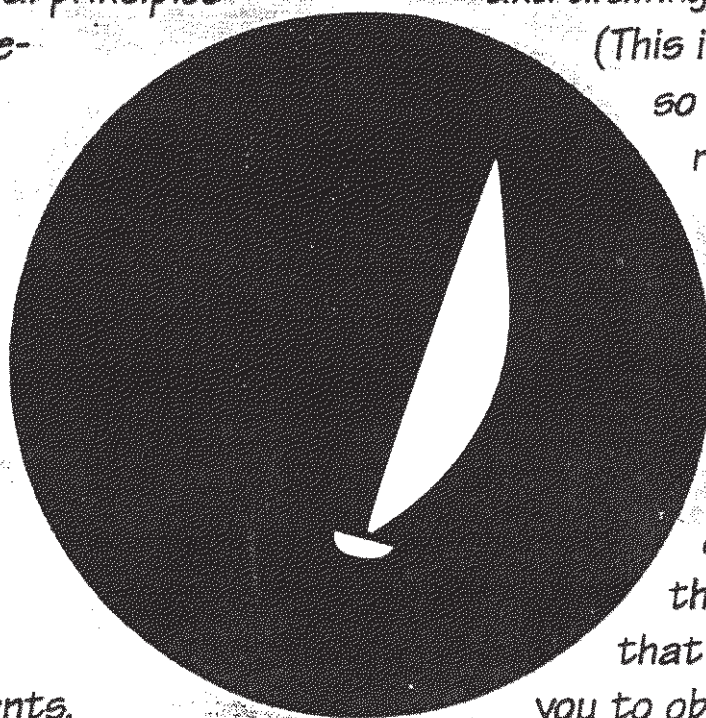
"In front of you, you have a book about the Europe-dinghy which explains the general principles

of sailing a Europe-dinghy as fast as possible. The important 70 percent that are needed to get a good result on the race-course. This book is not just for the Europe-dinghy sailor, but for the coaches and parents.

This book is divided into two parts: A - Equipment and B - Speed (How to get speed with your equipment).

In addition to this book, there is also a work-book with questions and drawings for overheads.

(This is only in Swedish so far) Even if the road to success is long, you can shorten it by focusing on the right areas of the Europe-dinghy and with good quality training on the water. My hope is that this book will help you to obtain the desired knowledge about your equipment and your technique which are both required for you to improve your boat-speed."



Written by Anders Larzon

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INTRODUCTION

A boat in balance or a out of balance? Both use energy. The difference is that the boat out of balance is not using energy efficiently, which does not improve the speed. The key to good speed is balance.

The background to balance lies in your equipment and the ability to utilize it. You must be able to sail the boat technically perfect to be able to use your equipment to the max. - and the road there is long.

Having the right hull, mast stiffness, sail-depth and so on - those are all important components - but the Europe dinghy weighs only 99 pounds (*45 kilos*)! How much do you weigh?

To sit right in the boat, to have perfect hiking position and to have perfect trim are all part of getting maximal boat-speed.

Details which you will find between different boats, masts and sails have not been included in this book. These differences are being changed at a continuous basis, and the most important aspect is that you understand the basics about the Europe- dinghy.

This book will give you these basics about the Europe-dinghy.

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Part A
Equipment

Chapter 1 THE HULL

When it comes to your hull, - shape, stiffness and so on - we can conclude that there is not much you can change or influence here. Only if you build the boat yourself you are able to control the shape and stiffness. The boat builders today have precise equipment and long experience with building the Europe-dinghies, so you do not have to worry about the boats too much. Even though, you do need to observe and consider the following issues which will have an impact on your boat.

HULL DESIGN

A one design boat like the Europe-dinghy has a few areas where the boats differ, but usually not more than ± 5 mm, and there are a few reasons for this. The boat builder can not build identical boats and the building materials are not stable enough not to allow for a few differences.

If the differences are too great ± 10 mm, then the boat builders can start to utilize these and experiment with the hull shape, an area which would not benefit the sailors nor the Europe-class.

Certain differences can increase the up wind speed, but at the same time, the down wind speed is reduced, so there are no real gain achieved.

The abilities to test the differences that exists in the market is possible by experimenting with different manufactures. The Finessa and the Winner boat are two examples of boats that are being used by the top sailors, and the boats are not identical, but the rules within the class are so strict that big differences do not exist.

Hull-Shape

How does the hull-shape influence the boat in the water?

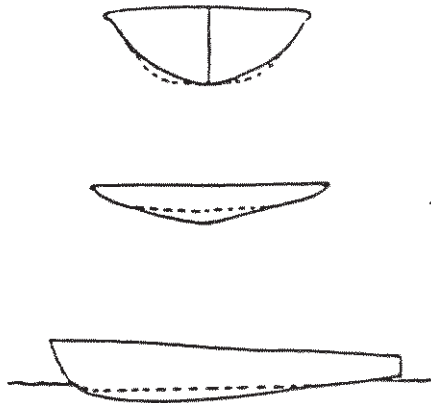


fig. 1

A hull which narrow and deep is less likely to drift sideways upwind, but will be instable on the down-winds compared to a hull which is less stiff.

The less stiff hull which is flatter underneath gives more stability down-wind, but is more difficult to keep the boat from drifting sideways upwind, unless the boat is sailed completely flat. (fig.1) (Compare the Europe with the Laser which is flatter on the bottom)

Conclusion: For a lighter sailor, a narrower and deeper boat is the best choice - at least for a sailor who weighs less than 132 pounds. (60 kilos)

HULL STIFNESS

The hull is constantly being exposed to the forces of the waves, mast and sailor. To allow the forces to be beneficial to the speed, the hull should be as stiff as possible, to limit the effects of both outside pressures and twisting of the hull.

A hull that is too soft will make a negative difference in heavy wind while going to windward and downwind in choppy short waves because there is a lot of force that is being lost into the soft hull. In addition, a soft hull has an increased chance of getting cracks and stress fractures permanently in the hull. A stiff hull will definitely last much longer than a soft hull.

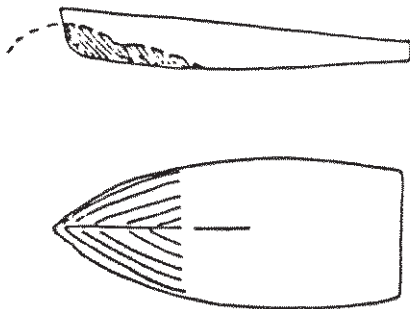


fig. 2

Pressure stiffness

The bottom of the boat should not be uneven. It is disadvantage to have a convex bottom, because this will reduce your chance of planing. A hull which is too soft will give in to the waves and create drag and your speed reduced. The waves are "sucked" into the boat and you lose speed compared to a sailor with a stiff hull.

The most important area of stiffness on your boat is the front of your boat where you first meet the waves. (fig. 2)

Twist stiffness

Not only is it important that the bottom of your boat is stiff, but your whole boat should be stiff. The stiffness is important due to the forces inflicted on your boat from the mast which again increases the sailors body movements and even more force is created on the hull. The combination mast and sailor creates a huge amount of force on the hull and a stiff hull is more capable of handling these forces. (fig 3)

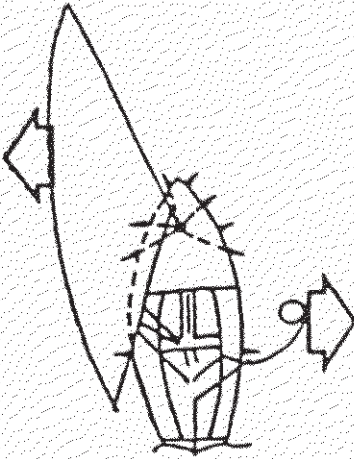


fig. 3

The hull stiffness is a result of extra strength built into the hull around the mast, front and side tanks. In addition, the centerboard trunk and the traveler give an additional stiffness to the hull. Even extra strength built into the stern of the hull helps because the rudder creates a lot of torque in that area.

HULL-WEIGHT

The weight of the hull is determined by the class rules. Extra stiffness, the thickness of the laminated boat layers and minimum weight are both important.

It should be mentioned that the Europe dinghy would not be any weaker if the minimum weight had been lower.

In the competition for the Europe market, the Europe dinghy boat builders try to build the best boat by making them as stiff and light as possible. The stiffness and weight combination can reduce the life of the Europe dinghy.

A Europe-dinghy hull shall weigh 45 kilo (99 pounds)

If the hull weighs less than the minimum weight, correction weights have to be put in, but not more than 5 kilo (11 pounds). Keep track of the weight of the hull through regular weighings, it is your responsibility to make sure your boat is the right weight.

Weight distribution

Weight distribution in the dinghy is mostly decided by the situation of the sailor, especially because the sailor weighs more than the hull! This does not mean that you should not try to make the boats balance better.

Every boat has a point where it will have the maximum benefit from balance of the boat. The concentration of the weight should be in the center of the hull i.e. in the middle. (fig 4,5) Here you also get an increased stability.

The class rules allow maximum 5 kilo (11 pound) of correction weights which have to be situated at least 200 mm from the bottom of the hull. This makes the best place for correction weights on the center-board case.

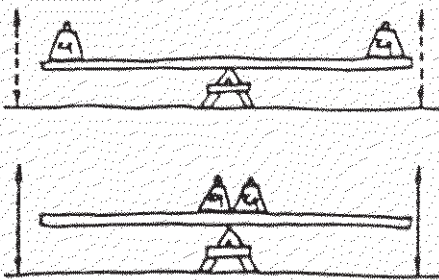


fig. 4

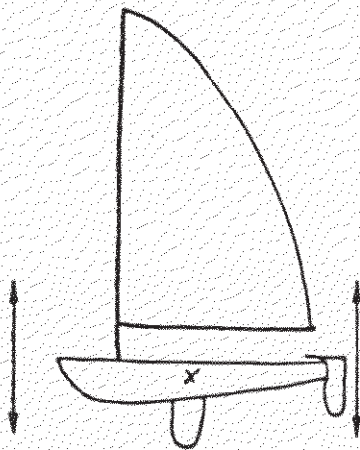


fig. 5

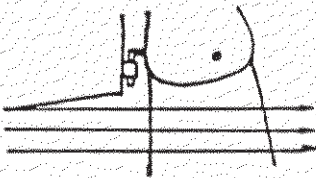
HULL RESISTANCE THROUGH THE WATER

The hull is naturally being slowed down through the water and we have to differentiate between friction and waves.

Friction

When the boat moves in the water, there is a thin film of water which follows the hull underneath. The amount of this film depends on how smooth the hull is. You do not want much water to be dragged with you in the water.

It is therefore essential that the hull is as smooth as possible. You can utilize rubbing compounds or waxes to get a smooth surface on the bottom. Wet sanding also reduces bumps, but should mostly be used on centerboard and rudder.



Waves

Wave friction occurs as a result of the hull having to force a huge amount of water away for the hull to get through the wave.



fig. 6

When the wave friction increases due to an increase in speed, the importance of having a sharp and smooth hull shape is increased in importance. If the stern has a rounded off edge, you will get waves which are being sucked up behind the boat and your speed is reduced. By having a sharp edge, the wave leaves the boat underneath, but it is important that the sailor's body position is right for this to take place. (*fig 6*)

Chapter 2 CENTERBOARD and RUDDER

CENTERBOARD

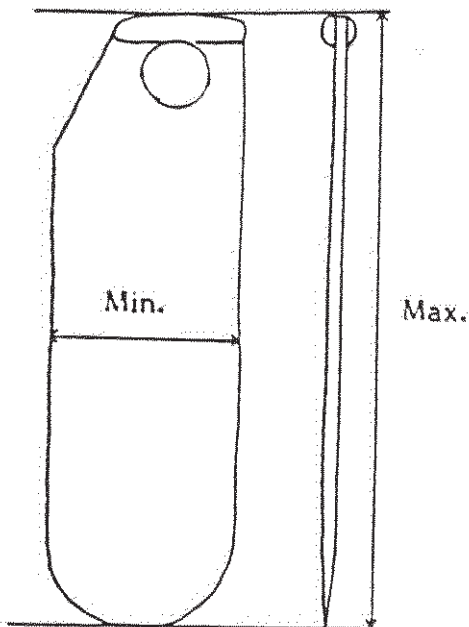


fig. 7

The shape of the centerboard and rudder is, in the majority of cases decided by the class rules. There are some ways of personalizing the centerboard and rudder.

For the centerboard and rudder, these are the areas of concern.

- * Stiffness
- * Shape and profile
- * Minimum weight (*has been reduced in importance*)

Shape

The shape of the centerboard shall be within the height of 1160 mm and be at least 300mm wide. (fig 7)

By different widths, the centerboard can be used to have different angles through the water, which gives optimal efficiency from the centerboard.

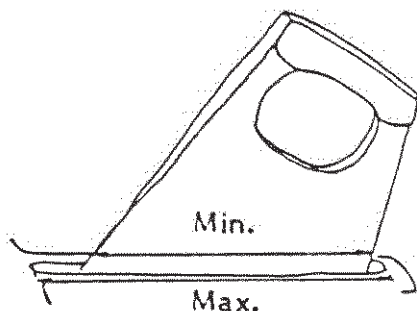


fig. 8

As you can move the centerboard as a whole or just change the angle of the board, you can get an improved trim, but you have to do it the right way.

The centerboard case should be as long as possible to allow you to utilize it as much as possible. (fig 8)

The boat builder has taken this into consideration when building the boat, so you do not have to worry about it.



fig. 9

Profile

The maximum thickness of the centerboard is 22mm, which gives you a great opportunity to make the centerboard stiff as well as having a nice shape.

The centerboard shall be max. 22 mm approximately 30-40% from the leading edge, which has to be round. (*fig 9*)

The trailing edge shall be sharp because it has to reduce the turbulent water from the centerboard. A round trailing edge would increase turbulence and reduce your speed.

There should be no possibility for movement for the centerboard in the centerboard trunk.

A maximum thickness centerboard will reduce the movements in the centerboard trunk.

To reduce the chances of movements in the centerboard trunk, most of the boat builders make the centerboard trunk the minimum thickness. This is done because the thickness of different centerboards can differ. You can use a file to open up the centerboard trunk to the wanted thickness, without making it too thick.

"Gaskets", the rubber or other pieces which are located around the centerboard should be a smooth fit around the board. It is essential to check the gasket regularly to make sure it is well attached to the boat. You can re-glue it with contact cement if it becomes loose.

Stiffness

The most important aspect of the centerboard is that it is stiff. A soft centerboard gives away for the force in heavy wind which will result in a reduction in pointing abilities.

RUDDER

The rules about the rudder are similar to the centerboard rules. It should be emphasized that the leading edge has to be rounded off because the water flow hits the rudder in a variation of angles due to frequent movements of the rudder while steering.

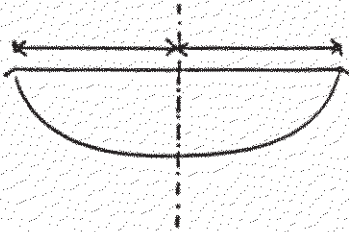


fig. 10

It is important that there is no room between the rudder and the tiller. A loose rudder in the tiller will reduce your ability to steer properly and further reduce your speed. In addition, you want a tight fit of the tiller on the boat so your steering is more precise and it will feel better to have a tight fit.

It is essential that the rudder is located right in the middle of the stern, a location you should make sure is right on your boat. (fig 10)

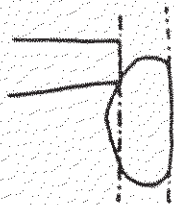


fig. 11

The leading edge of the rudder can be in front of the stern on your boat. The class rules say that the trailing edge has to be parallel to the stern, which leaves you with the opportunity to have the rudder a bit underneath the boat. By putting the rudder underneath the boat gives you a good feeling and reduces the pressure on the rudder. (fig 11)

Foil Conditions

The rudder and centerboard are both difficult to keep perfect. It is especially difficult to keep the trailing edge of the centerboard sharp with no dints or chips. If you get a dint in the centerboard or rudder it needs to be dried and repaired right away.

If the centerboard and rudder are being stored for a period of time it is easy for the foils to be bent and change shapes. If you are planning to store your foils for a period of time, the best thing to do is to hang the foils in the air by attaching a rope to the foils. This will allow the foils to keep their shape.

Chapter 3

BOAT PARTS and EQUIPMENT

Parts for the dinghy is an area where changes take place depending on fashion. The most important issue is that the parts that are being used are the best suited for the job and most efficient.

Remember that your cleats and their location should be in a place where you can adjust your lines as easy as possible while hiking flat out.

Of course, it is good with alot of adjustment but it is not good, if you can not easily adjust it while racing. It will break your rythm if it is not working properly!

Many of the adjustments on the dinghies have been standardized by the boat builders, but there is always room for personal adjustments.

Over the deck trim or under the deck trim?

Which ever you choose will not make a difference, but make sure you stay within the rules when you have your adjustments under the deck. All equipment needs to be very precise. Once you find something that works, stay with it. **The more adjustments you make higher the chance is that things will get destroyed!**

Halyard

The halyard should be soft and thin. It is important that the rope from the wire is soft so it does not eat the wire. The wire which is the link between the sail and the top of the mast should be checked regularly to make sure it does not snap. If one piece of the wire is sticking out, it is time to change the wire.

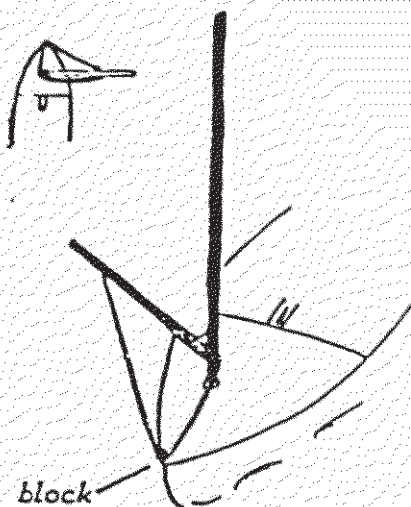


fig. 12

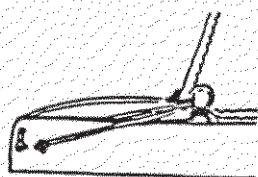


fig. 13

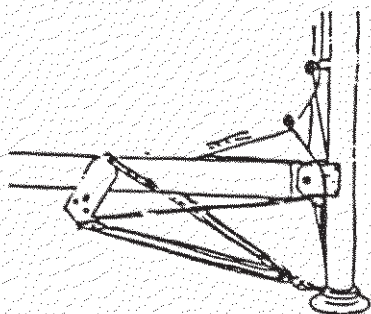


fig. 14

Blocks

The blocks should be as small as possible and preferably with ball-bearings. If your blocks are too big, your ropes have a tendency to get stuck in the blocks.

When mounting the blocks, you should use springs to allow the blocks to stand up and therefore allow the ropes to flow better. In addition, the springs will reduce friction and limit wear and tear.

Boom pulley

In light air, it might be difficult to get the boom out on a down-wind. It is therefore an advantage to put a block on your bow and elastic which will help you with such a problem. (fig 12)

Outhaul

There are many different ways to make the outhauls easier. More and more booms have internal pulleys which have made the outhaul easier to adjust. It is important to have a security line, in case the outhaul breaks. (fig 13)

If your outhaul breaks in a race and you have no security line, you have lost the race.

Hiking straps

The hiking straps should be wide and preferably waterproof. In addition, the hiking straps should be adjustable while racing. It is essential that the hiking-straps are well secured in the boats and that the screws and ropes are safe and not worn.

If your screw holes have grown, you have to fill in the old holes before you put new screws in. You can not just increase the screw size, because it will not last. There is a lot of pressure on the hiking-straps.

Boom-Vang

There are many different boom-Vang systems. The most important thing about the boom-vang is that it is located far enough back on the boom to allow you proper tension.

The Europe boom is very long and that means that the boom-Vang has to be quite long. Make sure the wire or the rope is long enough.

The wire has to be thicker than the halyard due to the high force on the boom-Vang. Always keep an extra wire with you in case it should break. (fig.14)

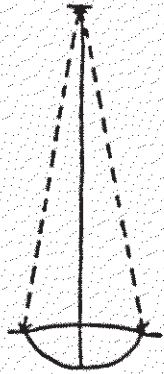


fig. 15

Traveler

The traveler should be adjustable from your hiking position. Some sailors have a system where the traveler can be adjusted from one side and both sides will be equal as a result of one adjustment. Others have to change the traveler on both sides. It might be an advantage to have the system where you have to adjust the traveler on both sides. The reason for that is that the waves and wind are different on the opposite tacks and you need different tension on the traveler.

Lines

The lines both for the control-lines and the main sheet shall all be as strong as possible with no ability to stretch. Therefore, kevlar ropes the best, but they should not have greater dimensions than you would normally use.

Mast-step

Check your mast-step every day before going on the water. It is especially important after you travel. While traveling, the screws and nuts often become loose (*and there is nothing worse than having a screw loose*).

1. Mount the mast-step properly and make sure it does not get stuck.
2. Make sure it is in the middle of the boat. Check it as soon as you get your boat. (*fig 15*)
3. The mast shall not be loose in the mast-step nor the mast-ring. There should be a tight fit.

Cleats

There are many different cleats and the best ones are servo cleats or other similar cleats which do not "eat" lines. Clamcleats "eat" lines and you have an increased chance of break-downs.

Most of the cleats like Harken and Ronstad have a plate which is put between the boat and the cleat to get the right angle on the line. Make sure you check your cleats to make sure that the lines are working as well as they possibly can.

Chapter 4

RIG

This chapter is highly linked to chapter 5 Trim and Technique because the rig is so related to speed.

When you choose a mast, the questions are often related to stiffness of the mast and the depth of the sail, as a result that the combination mast-sail is your "engine".

Be careful! The mast producers ask for your weight and the sail maker is also concerned about your weight, but nobody considers your technique!

A boat, just like a car, does not go fast just because you have a big engine. You need to use the gas pedal to adjust how fast your car is going. If you can not do it, it does not matter how big your engine is!

MAST

On the market these are some of the most popular mast producers;

* Winner, Denmark	Carbon
* Carbonspars, Sweden	Carbon
* Composite Spars, Holland	Kevlar
* Marstrom, Sweden	Carbon
* North, Great Britain	Carbon
* Proctor, Great Britain	Aluminum

These are some of the issues that you should consider before choosing a mast;

- * The mast has to have an constant bend throughout the mast
- * It has to "work", i.e. fluctuate as the mast is bent
- * Minimum weight
- * The balance point should be as low as possible
- * Minimum air resistance

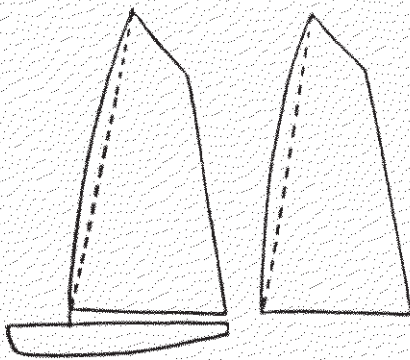


fig. 16

Mast-bend and flexibility

To allow the sail to get the perfect shape, the mast has to bend in a similar pattern to the sail when you use the main-sheet. The mast bend and the luff-curve on the sail should be the same. (fig 16)

The mast shape is effected by the main-sheet tension as well as the mast position. The mast position is regulated by the mast-step.

In fig. 17 a + b you can see the difference between a straight and a bendy mast and the effect from main-sheet tension.

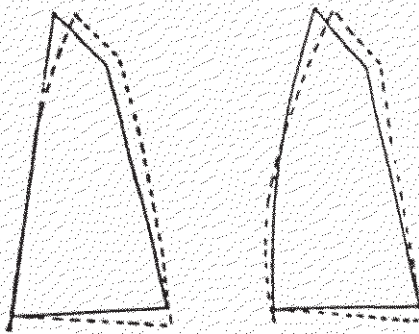


fig. 17 a+b

The mast stiffness in relation to mast-step position and main-sheet tension effects the leech and also the twist in the sail. (fig. 18)

Conclusion: The mast-bend and leech-tension are a result of the tension on your main-sheet. In addition, the tension is also a result of mast position in your boat.

How the mast works in waves depends on the flexibility and the ability of the mast to straighten out again, combined with how much your body is working through the waves.

The main goal is that the top section of the mast should fall a bit to the side in the waves but come back quickly. A soft mast will bend alot sideways and open the leech tension and reduce force on the sail. (fig. 19)

If the mast is too soft, and it bends too much sideways, the mast will bend too much and you loose too much power and your speed will be reduced.

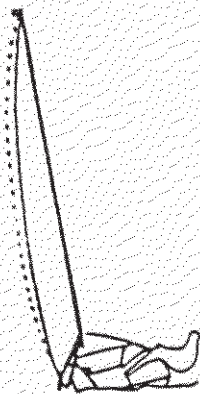


fig. 18

When the distance between the top of the mast and the transom is reduced, the tension on the leech will be less. Then the sail twists out and the force which makes your boat heel over is reduced. (fig. 20)

The side-ways mast bend is essential. If it is too soft low on the mast, it will affect the whole mast, and it does not matter how stiff the mast is further up. (fig. 21) Too much force is being lost.

With the help from the traveler and your hiking technique, you use the mast to increase your boat speed. Both the technique and the traveler will alter the twist in your sail. (fig. 22)



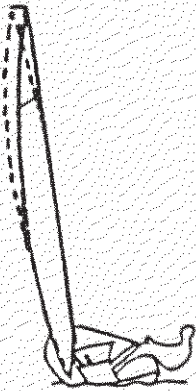


fig. 20

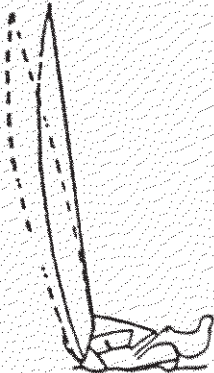


fig. 21

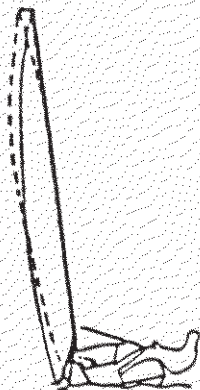


fig. 22

As you see, there are many changes you can do before you need a stiffer mast.

A stiffer mast forces you to reduce the tension on the main-sheet to compensate for the increased tension on the leech. A stiffer mast makes it more difficult to reduce the depth close to the mast. It is therefore important to have a sail that is made for your mast.

What are the limits for how stiff or soft mast you need?

- * Sail shape
- * Your weight and strength
- * Your technique

The mast stiffness can be measured in an objective fashion (fig. 23), while the flex has to be observed. There is of course a relationship between the stiffness and the ability of the mast to flex back after it has bent. Established sailors have the ability to know what they want from a mast as well as the sail.

Remember - It is the combination sail/mast and the sailors technique which decides the speed!

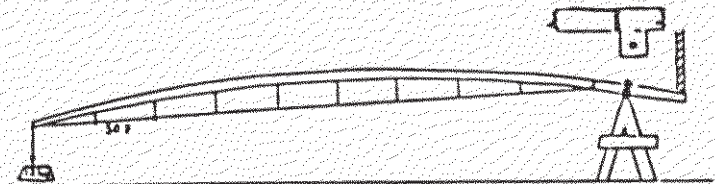


fig. 23

You should measure the stiffness of your mast approximately twice a year. What happens with the mast? What changes should occur and what information can you use from other masts you have used?

Conclusion; A too soft mast is slow because the mast bends and reduces the wind force and therefore your speed is reduced. In addition, it flexes slower.

A too stiff mast can be changed by using a flatter sail. Your sail-maker should help you choose your mast!

Mast-track

Some mast producers have mast tracks that are mounted on the outside of the mast, while others have built it into the mast. A mast which has the track on the outside can be made softer by cutting small lines in the track. This can help you get the right shape on your mast if your mast is too stiff.

BOOM

When we discuss the spars and the sail, we emphasize the mast and the sail combination. The boom is important because it is quite long compared to the mast. The boom influences the sail shape and the depth of the sail-cloth.

The most important aspect of the boom is that it is as stiff as possible both down and sideways as well as being light.

There are different boom profiles (*fig.24*) and on the market, these are the most dominating boom producers;

- * Proctor Aluminum
- * Holt Allen Aluminum
- * Marstrøm Carbon
- * Finessa Aluminum
- * Sailpro Carbon

(Carbon booms will be outlawed in 1997)



*Stiff vertically
Soft sideways*



*Soft vertically
Stiff sideways*



*Stiff vertically
Stiff sideways*

fig. 24

SAIL

Every sail producer has new ideas on what is a fast Europe sail. It would be good to discuss the different sail designs here, but it is too difficult in a short space. In addition, the sail makers have different ideas for certain waves and wind conditions. It is also a very big difference between the mast and the sailing technique, all effecting the sail shape and producer. The sail makers change their sail design frequently to keep up with the change in mast designs and new technology.

Discuss with the sail maker about his/her ideas about the sail and if he/she is willing to help you, build up a relationship with the producer.

Here is a list of the most used sails;

- * Blixtsegel - Bengt Johansson, Sweden
- * KC - Kent Carlson, Sweden
- * Erneborn - Sweden
- * Green - Jørgen Holm, Denmark
- * North Sail - Many lofts world wide
- * Rebelsail, Sweden
- * Toni Tio, France

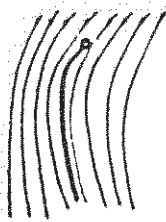


fig. 25



fig. 26

How does a sail work?

Generally, we can say that the wind blows past the mast and the sail. The wind which enters the sail on the windward side takes the short way, while the wind that enters the sail on the leeward side takes the long way around the sail. (fig. 25) The wind which pass the sail is effected by the shape of the sail and the angle of the wind.

The wind speed is greater on the leeward side and this creates the difference in pressure. This pressure difference makes the boat go forward.

The force is created and it effects the boat in two ways, one is that it makes the boat heel over and second it creates the force to move you forward. (fig.26)

The heeling over makes the boat go sideways and is something you want to avoid.

What shall the sail look like?

Every sail-maker has their own ideas of what a dinghy-sail should look like. These ideas are the reason for the difference in the cut and shape of the sail.

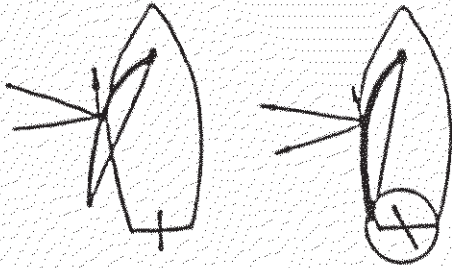


fig. 27

The sail cloth should be smooth over the whole sail. The wind will enter the sail at the same angles, regardless if it is low by the boom or at the top of the mast.

The wind does not enter the sail at same angle all along the mast. Further up the mast you get the more wind you will find. On top of the mast you will find a different angle of the sail as a result of a increase in wind-strength.

(fig. 28)

Due to the increased wind-strength, it is necessary to have twist in the sail with a flatter entrance at the top of the sail. (fig.29)

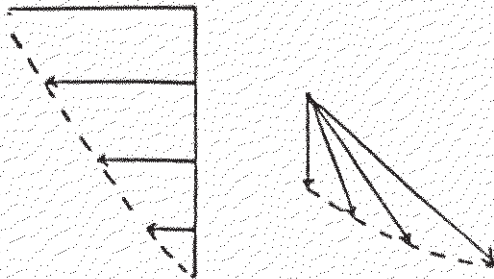


fig. 28

The easiest way to look at your sail is to head up on a close haul until the sail luffs close to the mast. If the cloth is equally distributed along the mast, the sail will luff at the same time along the whole mast.

SAIL-DEPTH

The cloth is measured by finding the depth of the sail. The depth depends on the deepest part of the sail and the width of the sail.

A general rule is that the lower part of the sail shall have a depth of approximately 40-50% and approximately 20-30% in the upper third of the sail. (fig.30)

The percentage is measured from the mast!

There are of course differences to these numbers depending on the sail maker and his/her ideas.



fig. 29

With the help of trimming your sail, you will change the depth of the sail depending on the wind conditions, waves and your own preferences.



fig. 30

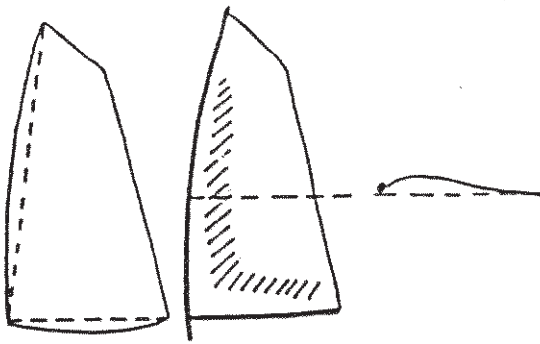


fig. 31

For the sail-maker, there are two ways to create depth in a sail.

Shape of the mast and the boom

The sail is sown with shape in both along mast-curve and the boom depending on the bend characteristics of the mast and boom. When you put your sail on your mast and your boom, the sail should fit the bend of the mast and boom. (fig.31)

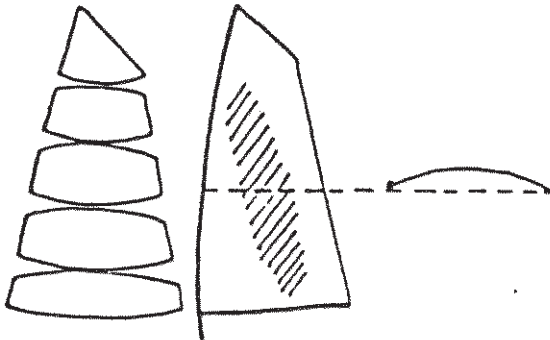


fig. 32

Shape in the seems in every panel

When a sail is made, it is made by sowing together sail-panels which are shaped. The panels are put together so that the cloth is smooth and the depth is in the right position. (fig.32)



fig. 33

Sail fit on the mast

For Europe sailors as well as other sailors, it is important that the sailor knows the characteristics of the mast and sail so you will get a perfect fit. The sail and mast have to work together for you to utilize the equipment.

The basic way to see if the mast and sail fits are the following:

1. Put the sail up on the mast and pull the main-sheet in all the way.

You should see lines similar to a sun over the whole sail which should be greater and longer low down in the sail and shorter and smaller further up. (fig.33)

If that occurs, the sail fits the mast.



fig. 34

2. If there is a concentration of stripes in a certain area, the mast is too soft, or the sail does not have the right luff-curve. (fig.34)

You can solve this problem by altering the luff-curve and or alter the bend of the mast by cutting into the mast-track.

You can only cut the mast-track if the mast-track is on the outside of the mast and is made of aluminum.

Another alternative is to change the luff-curve of the sail.



fig. 35

3. When you sheet in and then tighten the Cunningham, the lines should disappear along the whole mast. (fig.35)

If you get a little bubble along the mast, cut the mast-

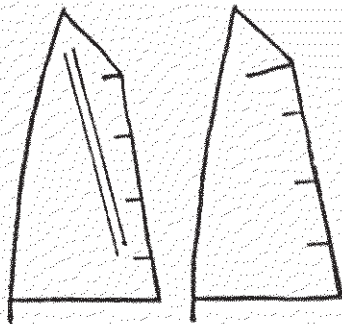


fig. 36

track right here or get the sail-maker to alter the luff-curve.

Are you unsure? Take your time and study your sail and talk to your sail-maker!

Battens

The battens are there to stretch out the sail-cloth and stiffen the leech of your sail. The bigger the sail is (in the head), the longer the battens need to be in the area. (fig.36)

If the top batten is not long enough, you will see wrinkles which run vertically from the top batten and down towards the bottom batten.

The battens should be as light as possible and it is important that they do not disturb the sail-cloth too much where the batten starts. They can not be permanently be attached to the sail.

Sail-Cloth

The sail-cloth is very important for the characteristics of the sail. The thickness and the flexibility of the cloth both determines the success of the sail. But you have to let the experts the sail-makers determine the right sail-cloth for you.

Sail protection

The sail can be right, but you might not be utilizing it perfectly, unless you use your main-sheet right;

- * Never let your sail dry by leaving it on the mast. The fibers will be destroyed.
- * The sail shall always be cleaned of salt. Salt will take away the smoothness of the sail.
- * Roll the sail along the fibers and try to avoid bending or folding the sail, because it will cut the fibers!

Part B

Speed

Chapter 5

TRIM and TECHNIQUE

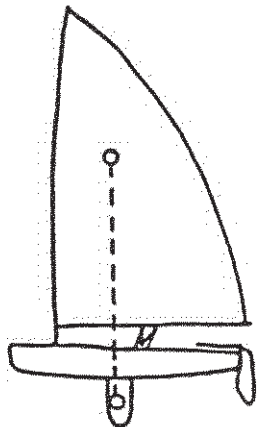


fig. 37

Earlier in this book, we discussed the main principles of good equipment in the Europe dinghy.

The rest of this book will cover how to get good speed with the equipment you have. The way you trim your equipment and how you sail technically will determine the speed of your boat.

What you want to be able to do is to get the best balance between rig, hull and sailor.

To be able to sail the Europe-dinghy fast, you have to be able to know the balance of the boat by knowing the force between you and your boat.

You can only discover this by spending a huge amount of time on the water.

The balance of the boat, if it wants to luff or bear off, depends on the center of pressure on your sail and centerboard. (fig.37)

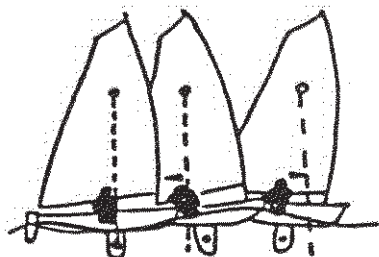
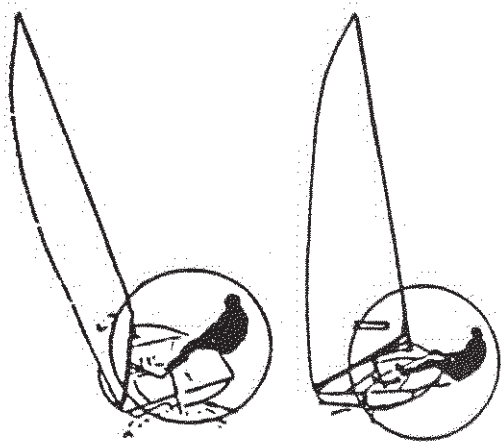
You can alter these "centers" so you can find the balance and harmony in your boat and therefor be able to get optimal speed.

In the Europe-dinghy, you need to be in the right position in the boat. You forward body position and your hiking position combined with your ability to steer the boat are very important. (fig.38)

Using your steering and body position correctly help you use conditions like waves and wind to your advantage and to smooth out the different obstacles like sharp waves and so on. - You have to be smooth and work with your boat to be able to get your boat-speed to maximum.

If you compare a board sailor and a Europe sailors, you will realize the differences right away, but.... the principles are the same when it comes to the balance!

The difference is that the board sailors stand and Europe sailors sit while sailing.



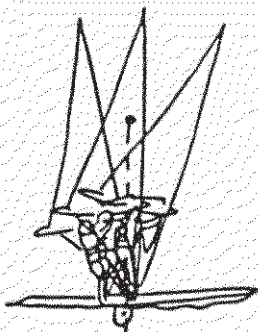


fig. 39

The Europe sailor uses the rudder to steer, while the board sailor uses the sail to alter the center of the pressure on the board to change its course. *(move sail, mast and body position)* (fig.39)

The Europe sailor has a lot to learn from a board sailor. -
The best Europe sailors use their bodies to get the perfect balance and therefore get maximum speed!

There are certain limits on how much you can use your body in the boat. The International Yacht Racing Rule § 54 explains what is allowed and what is not. The main principles are that the wind and the waves shall be the engine for your boat. That means that major body-movements and frequent rudder movements and many quick pumps with the sail are illegal. These movements increase the boat-speed above what is possible by just using the wind and waves. Instead you can pump one time on the waves and therefore increase the boat-speed in a natural way.

But it is the wind and the waves which are the engines - do not forget that!

HIKING-POSITION

To be able to hike as efficiently as possible, you must be able to trim your boat properly. In addition, you have to steer in accordance with the wind and waves to get good pressure in the sail. The pressure needs to be perfect to get the best speed and pointing height!

This means that with the right trim, you should be hiking full from medium air to heavy air and always have a flat boat to have maximum speed and pointing height.

The hiking-position in the Europe-dinghy can be different depending on the sailor, but there are some positions which are more efficient than others. The main point is to hike as long as possible and to use the force to sail the boat fast.

A race takes a long time and it means that you will hike maximum in intervals. There is no way you can hike at maximum all the time. The maximum hiking time should be as long as possible and the "rest" period as short as possible.

To be able to hike as long as possible, you need to hike the right way to save energy but at the same time be efficient.

- Are you short or tall?
- Do you have long or short hiking-straps?
- Can you alter your hiking-straps while hiking?
- Control-lines - Can you reach them while hiking?
- Is your hiking-position comfortable?

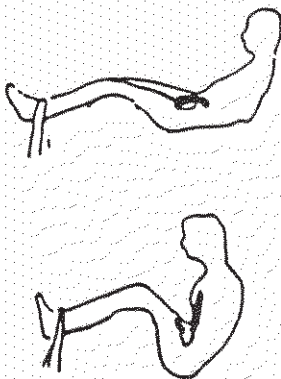


fig. 40

Medically is it important to know if you hike using your abdominal muscles or your hip-flexors. (fig. 40)

When you hike with bent knees you use mostly your abdominal and when you hike with straight legs, you use mostly your hip-flexors. None of your muscles are relaxing, it is just the degree of how much each muscle is being used. The proof is that your legs and back muscles also get tired from hiking.

Conclusion:

1. Wide and short hiking straps with straight legs.
2. Keep the length of your hiking-straps short so that you use your hip-flexors as much as possible.
3. Use your legs and the hull as much as possible.

If you want to hike throughout the whole race, use hiking-pants. Hiking-pants reduce pressure on your legs and therefor the blood circulation is kept to a maximum. You

can train without hiking-pant to increase your strength even further.

RUDDER and TILLER MOVEMENTS

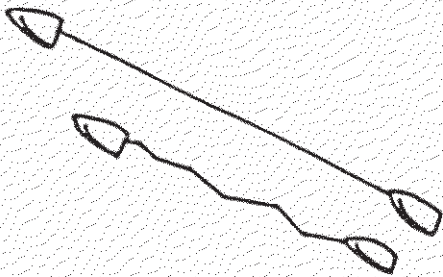


fig. 41

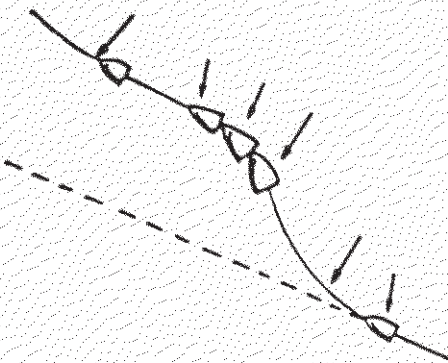


fig. 42

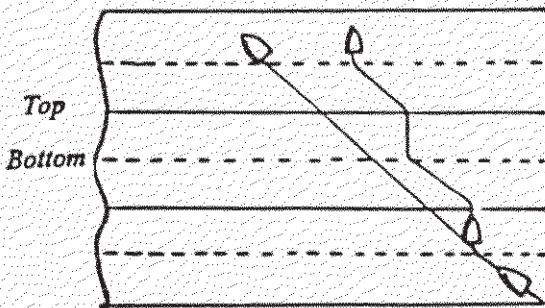


fig. 43

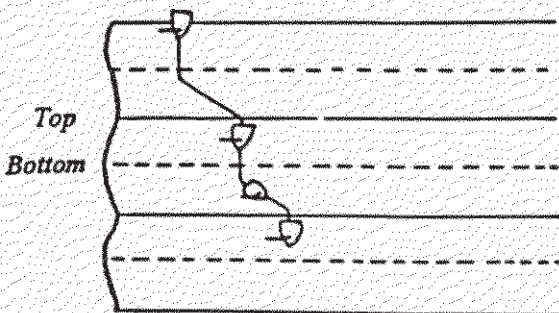


fig. 44

Every movement with your rudder reduces your speed. By working with your rudder all race means that you sail further than going in a straight line. What decides how much you should move the rudder are the wind and the waves. (fig.41)

When you are faced with small waves, you should keep your rudder straight and concentrate on the wind changes. When the wind is gusting, you can point higher in the gust. Move your tiller away from you very carefully so utilize the gust and the increase in wind. The movement should be soft and constant. (fig.42)

If you have a problem with keeping your boat flat in the gust, - open the sail by using the traveler as well as with the Cunningham!

When the waves increase in size on the wind-ward leg, you have to steer according to the waves. On the bottom of the wave you point higher and on top of the wave you bear off to increase your speed for the next "up-hill". If you steer just straight, you will loose speed when you hit the wave and you loose height. (fig.43)

On the down-wind leg you are faced with the opposite problem. You want to catch the wave and to use them to increase your speed. You can do this by luffing up to catch the wave and then to bear off and ride the wave as far as possible. (fig. 44)

The next problem is to stay on the wave. This can easiest be done by steering by the lee of the sail. (Even lower than dead down wind)

If the wind is gusting down-wind, it is important to bear of when you are in a gust and to luff up to catch the next gust. This will allow you to spend more time in the breezier condition.

Waves are not consistent in either size or frequency. This will force you to do alter your direction and your rudder movement all the time!

Look further at the Technique and Trim in light-medium and heavy wind condition!

ACCESSORIES

To help you to trim and steer your boat perfectly, there are many accessories which are there to make it easier for you to get good speed.

Tell-tales

As we have said before, perfect trim is a question about feeling and to be able to get the right feeling, you need to spend a lot of time on the water. One utility to help you, are the tell-tales.

Tell-tales are wool lines which are attached to the sail with sail tape. These wool-lines will be a good "tool" for you when it comes to how much you can sheet in and how high you can point.

Put your tell-tales approximately 30 centimeter (1 foot) from the mast. The frequency of the tell-tales should be at least three along the mast where two should be in the bottom half. In addition, put a few tell-tales along the leech of the sail to see if your sail is open or closed. Also, put one set of tell-tales by the window if you have one. (fig.45)

How to use the tell-tales:

The tell-tales are flying straight out

The wind is flowing parallel to the sail

The tell-tales have no constant pattern

The wind is turbulent along the sail

* If the wind hits the sail with the right angle = the tell-tales will flow parallel straight back. (fig.46-a)

* If the tell-tale on the wind-ward side flows forward = the boat is pointing too high or your sheet is too loose. (fig.46-b)

* If the tell-tale on the leeward side is flowing forward = the boat is pointing too low or the sheet is too tight. (fig.46-c)

If for example the lower tell-tales are flowing parallel to the sail but the top tell-tales are flowing forward on the wind-ward side, it is a sign that the top of the sail is closing too much. A solution is to open the sail more and to increase the twist. (fig.47)

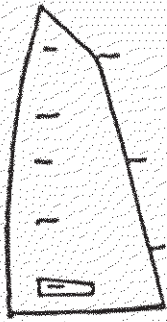
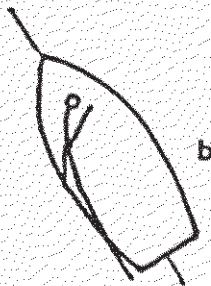


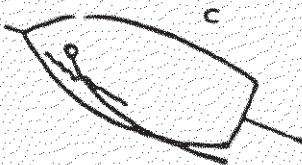
fig. 45



a



b



c

fig. 46

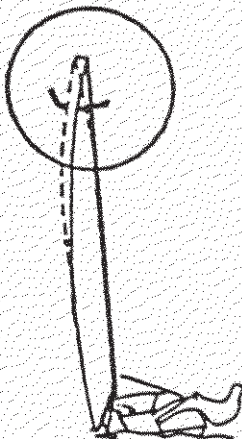


fig. 47

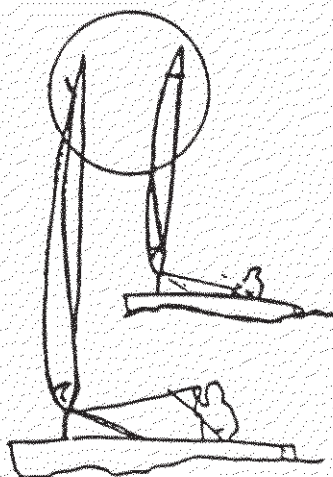


fig. 48

Tell-tales are used down-wind too! (fig.48)

These are the principles for tell-tales. The way the tell-tales behave depends on how close they are located to the mast because the shape of the mast creates turbulence.

Do your own testing on where you like your tell-tales to be located!

Wind-indicator

The wind-indicator which is located at the top of your mast is used mostly on the down winds. On the down wind it is important to get the right angles to the wind and by looking at the wind indicator you can easier see the right angle.

Europe sailors are very different than other sailors when it comes to the usage of wind indicators:

At the 1993 Worlds Qualifier Regatta in Sweden, only approximately 10 percent of the sailors had a wind indicator. At one of the light air races, I wrote down how many of the top 20 female sailors who had a wind indicator. 8 out of 20 had a wind indicator or 1 out of 6!

Measurements

Some sail-makers have numbers written down on sticker on how to trim you boat. (i.e. mast rake and traveler position) You can use tape or just a pen to make your own measurements. It is important to have numbers so you learn from times when you were sailing and fast compared to the times when you were slow.

In addition, make sure that the sailors you train with have the same numbers in the same place as you to make training more efficient. First then you will be able to compare your boat with others.

Of course feeling is the most important trimming tool, but the process of getting to the perfect feeling will be easier if you use measurements on your control lines.

Measurements should be put on these control lines:

- * Cunningham
- * Outhaul
- * Traveler
- * Inhaul
- * Centerboard
- * Main sheet

SAIL PRESSURE AREA

Trim and the physics regarding the mast

The rig is the engine in your boat. In addition, the mast gives you the speed and the pointing abilities depending on the stiffness and the flex with the mast as well as the depth and design of the sail. What matters is how you use the mast and the sail and how well you alter the sail when the wind and the waves change throughout a race.

Below you will find the different control lines which are your tools when dealing with the mast and sail. (fig.49) You need to combine these control lines with your technique to get the optimal speed and pointing abilities.

Main-sheet

The main-sheet decides how much the mast will bend and therefor the leech tension which is a result of the mast bend. Everything is though a combination of all the control lines. (fig.50)

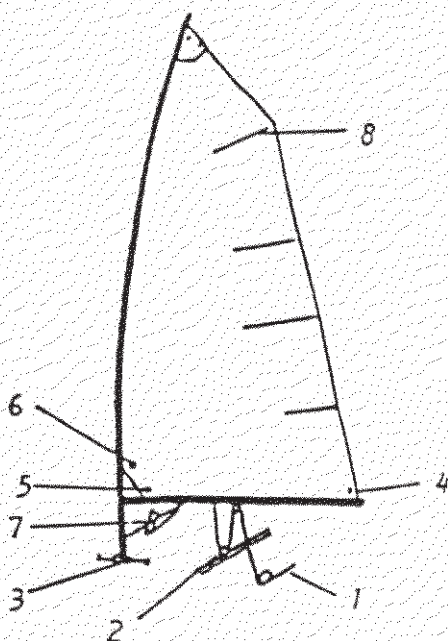
Traveler

The traveler regulates the angle of the sail to the wind both the luff and the leech angle. It is said that the traveler can "open" and "close" the door. (fig.51)

The traveler is very important to have in the right position to get the best speed and pointing abilities.

When you let your traveler down to leeward, you open your sail but you still control your leech. The opening takes place with a controlled leech, but you will loose your ability to point - but when your point lower your speed is increased and you can point higher!

The traveler regulates the twist. By pulling the traveler closer to you, you will open the top of your sail while the lower leech is still closed. (fig.52)



- | | |
|------------------|-----------------|
| 1. Sheet | 5. Boom in-haul |
| 2. Traveler | 6. Cunningham |
| 3. Mast-step | 7. Boom-vang |
| 4. Boom out-haul | 8. Batten |

fig. 49



fig. 50

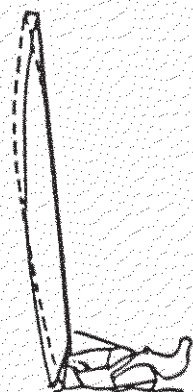


fig. 52



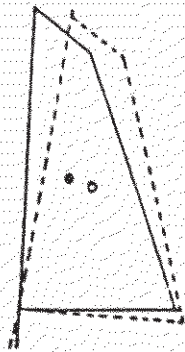


fig. 53

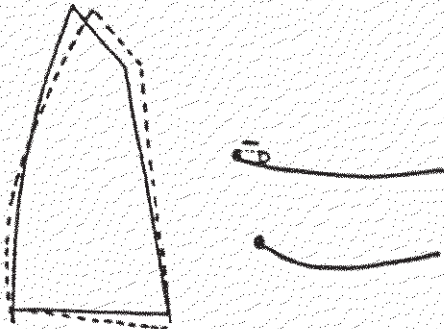


fig. 54



fig. 55

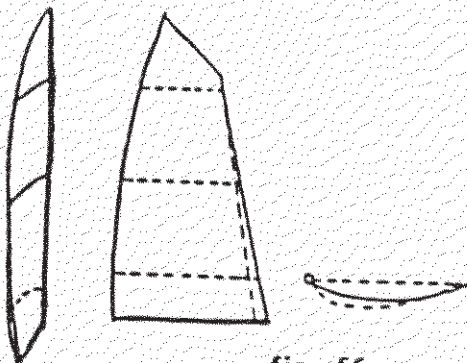
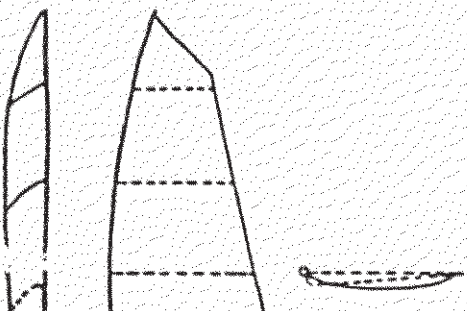


fig. 56



Mast-step

The mast-step is the most important trimming possibility you have and should be measured before you go on the water and after you get in every day. There is a danger that the mast-step moves during travel and sailing due to shaking.

Do not get caught up on how other sailors have their mast-step because you do not know how their mast and sail reacts to the conditions!

When you put your mast step forward, your mast will be further back. You will move the center of the force in your sail back compared to your boat. (fig.53)

With the mast-step and the main-sheet you alter the tightness of the leech. In addition, the depth of the sail is moved back which gives you a deeper sail. The opposite is true if you move your mast-step back and therefore your mast forward.

If you straighten the mast, you will move the depth further forward and flatten the sail. In addition you will get an increase in leech tension as a result of increased main-sheet tension. (fig.54)

The mast-step also regulates the twist in your sail - more or less twist as well as where the twist will be located. The further back the mast is, the lower and bigger the twist is and you will lose some of your power. (fig.55)

Boom out-haul

The boom out-haul regulates the cloth in the whole sail, but the result is greater lower down in the sail.

When you tighten the out-haul, you reduce the depth in the lower part of the sail - the sail-cloth is moved further back along the boom. (fig.56)

Boom in-haul

The boom in-haul regulates the lower front corner of the sail. When you tighten the in-haul, you will flatten the sail along the boom and move sail-cloth forward. (fig.57)

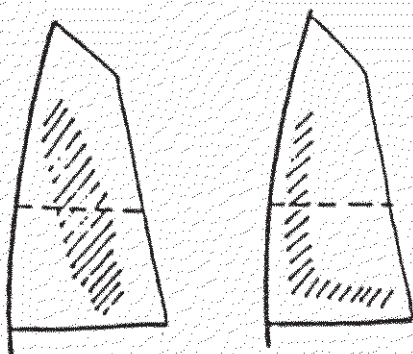


fig. 58

Cunningham

When you tighten the Cunningham, you will move sail cloth forward and down towards the boom. *(fig.58)*

The top section of the sail becomes flatter and you will be able to keep you boat flatter. The leech will be able to open more and you have an increased twist in the sail which will give away some of the power. *(fig.59)*

With the help from the cunningham, you do not only lower the center of the power in your sail. In addition, when you tighten the Cunningham, the depth of the sail is moved forward. This will reduce your boat's wish to head up when sailing upwind. *(fig.60)*

With a very tight Cunningham, the depth of the sail is moved forward. The result of this is that your sail will have a different angle to the wind. This again will result in an ability to sail closer to the wind! *(fig.61)*

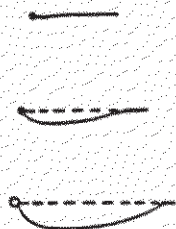


fig. 59

Pointing is not everything. When you are faced with big waves and the necessity to accelerate at the start, many times you have to go for speed rather than pointing high.

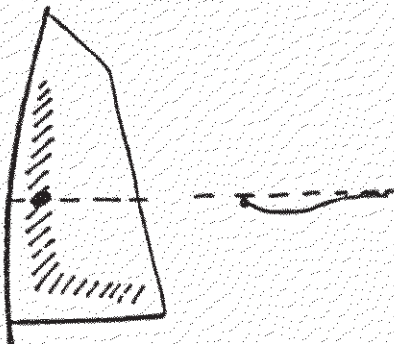


fig. 60

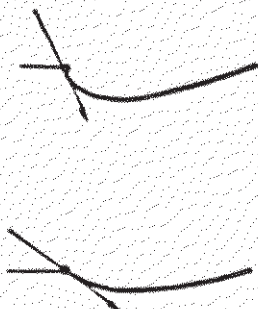


fig. 61

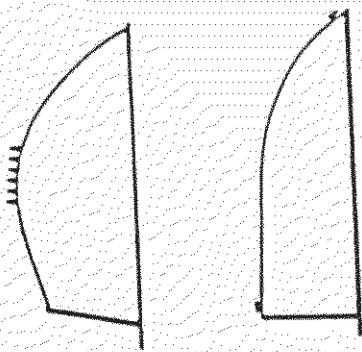


fig. 62

Boom-Vang

The boom-vang is necessary on the down-wind legs in both light and heavy wind. When you tighten the boom-vang you alter the mast bend the further the leech is altered.

It is important to keep the leech tension depending on the wind conditions. The lighter the wind, the less the tension should be. The leech down-wind opens and closes to pull the boat forward. It is not only the wind which opens and closes the leech, but also your body movements! (fig.62) The leech should open and close easily down-wind.

While sailing down-wind, the boom-vang helps control the stability of the boom and therefor the stability of the boat (fig.63)

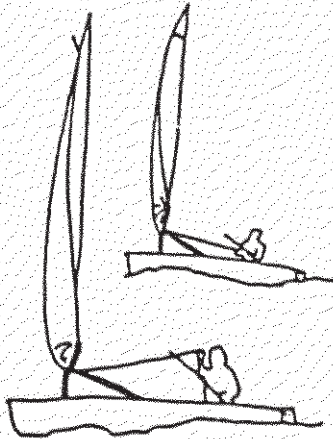


fig. 63

When you sail in extremely light wind, the boom-vang can be an advantage even up-wind.

First of all, the boom-vang flattens the sail close to the mast to get better pointing abilities. (fig.64)

Furthermore, you can alter the angle of the wind by using the traveler to get the right pressure in your boat. In medium wind, the boom-vang is only used on the down wind legs.

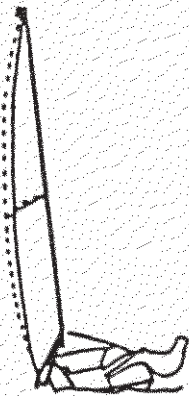


fig. 64

LATERAL PRESSURE

Trimming possibilities

Centerboard (Fig.65)

The decrease in pointing abilities you achieve when opening up your sail can be compensated by the centerboard. By having the centerboard in the right position you can compliment the mast and increase the speed and pointing of your boat. In this area, it is possible to get both height and better boat speed at the same time!!!

- Centerboard is angled forward/backward
- Centerboard is moved forward/backward
- Centerboard is moved up and down in the centerboard trunk.

Rudder

The rudder is your best tool to "feel" the balance and in-balance of your boat. (fig. 66)

The rudder shall not be angled outwards, because that makes it very difficult and hard to steer the boat.

If you do the opposite, i.e. angle the rudder blade underneath the boat, you will get less feeling from the rudder. The boat is easier to maneuver.

Position of the sailor

The sailor's position back and forth as well as in and out in the boat is very important. In most cases, the sailor sits too still in the boat!

As the boat moves through the waves, the lateral forces are changing on the hull and foils in every wave both before during and after the wave.

In addition to steer with your body, your body is also used as a trimming tool!

In the Europe-dinghy, the position of the body is important for the movement of the rudder, other trimmings, centerboard as well as the mast. (compare with the board sailor)

There is no question that the movement of the sailor changes the whole boat. (fig. 67)

The IYRU § 54 decides what is allowed when it comes to body movements.

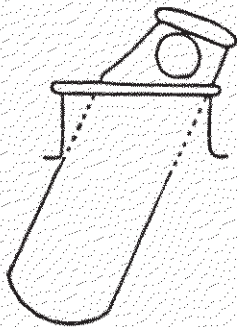
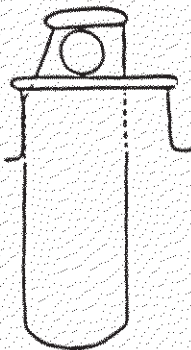
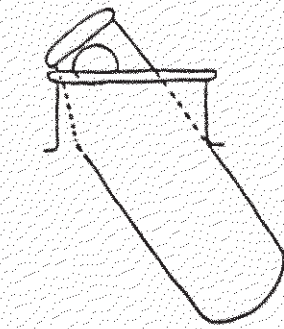


fig. 65



fig. 66



TECHNIQUE and TRIM in different wind and wave condition

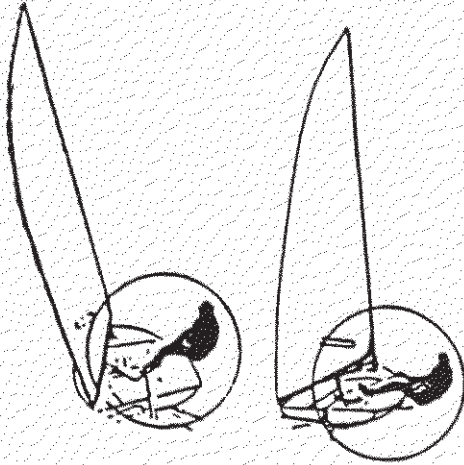


fig. 68



fig. 69



fig. 70

BASIC TECHNIQUE

The optimal speed is achieved when the boat is sailed as flat as possible with the maximum pressure on the sail. (fig. 68)

This means that the perfect pressure in the sail is accomplished only when you are fully hiking. In extremely light conditions, the boat shall be sailed with a slight leeward heel to allow the leech to open. It is important to have a loose leech in light conditions which gives you an open leech and the boat "drifts" forward easier.

The main rule about sailing your boat flat is to hike max., but there is a combination between body movement / rudder movement and traveler / other trimming. Remember - hold on to the main-sheet as long as you can! Do not cleat it!!

How to utilize the mast?

With the help of the trimming possibilities and your body position you get power from the mast, sail and boom. This force shall be utilized to get speed and pointing abilities.

The back ground to get good power is to have the depth of the sail as far forward as possible without stalling your boat - the sailcloth forward. (fig. 69) This is especially true when friction is great, i.e. when the waves reduce the speed.

When friction is reduced, you do not need as much force. The cloth can be moved further back and you get a flatter entrance to your sail. With the flat entrance and the depth of the sail further back, you can point higher. (fig. 70)

Of course, the speed is essential because the greater the speed, the better you can point, but there is a limit!

LIGHT WIND

UPWIND



fig. 71

In light air, it is very difficult to find the right weight and balance in your boat. In addition, you have to remember all the time that the stern of our boat has to be out of the water.

- * One leg should be in front of the traveler, while the other leg as close to the traveler as possible, while still being behind the traveler. With your legs in this position, you can use your upper body to adjust back and forth, depending on the changes in the wind conditions.

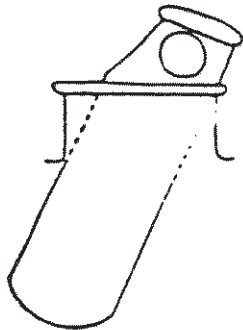


fig. 72

In extreme light air conditions: sit down and heel your boat to leeward, with a loose main-sheet to open the leech. (fig. 71)

The centerboard is placed to increase your pointing abilities. The way this is done is to angle your centerboard forward. The boat now wants to head up and your pointing is improved. (fig. 72)

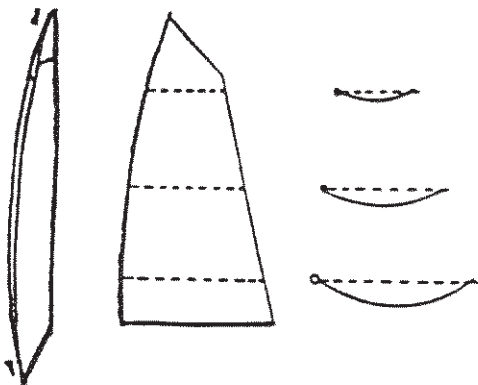


fig. 73

In light air, it is essential that the sail opens in the top for you to be able to get speed. If the sail closes, the air is disturbed as it goes around the sail. In most cases the two problems you have might be that your sail is too full or that your leech is too tight. (fig. 73)

You can alter the leech by moving the mast back (*i.e. mast-step forward*), to reduce the leech tension and to increase the twist in the leech.

By moving the mast back, you move the end of the boom closer to the stern and you will pull in your main-sheet less. (fig. 74)

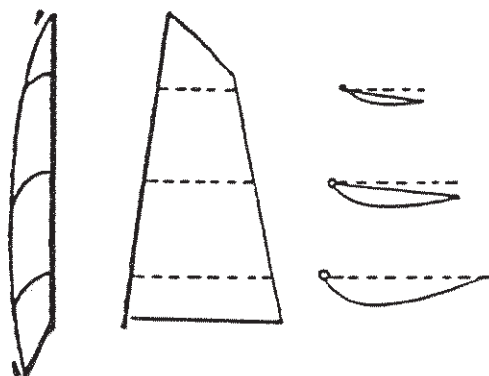


fig. 74

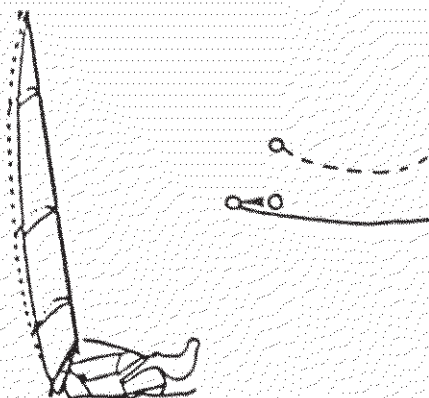


fig. 75

At the same time, you must concentrate hard on pointing right. This can be difficult because the luff-curve is so deep. You can not flatten the luff-curve due to the lack of main-sheet tension.

With the help from the boom-vang, (*fig. 75*) you can achieve a flattening of the luff-curve. In addition, by tightening the out-haul, small tension on the Cunningham and in-haul, you will be able to get a flatter luff-curve.

The goal is to flatten the entrance to the sail to get the right angle to the wind and therefor better pointing abilities.

Problems:

If the mast is too stiff, the leech will be too tight.

What matters:

1. The top section of the leech must not "fall in", but rather open a fraction.
2. Try to get the mast to bend to flatten out the entrance and the luff-curve to be able to point better.

In extreme light air conditions, it is important to sail with a very loose main-sheet and to sail with a slight leeward heel to open the leech. (*fig. 71*)

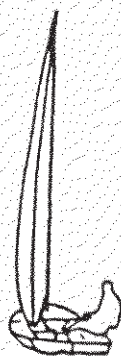


fig. 76

If you sail with a heel to wind-ward in extreme light wind conditions, you might increase pressure on your rig. (*fig. 76*)

On the other hand, you will have the tendency to point too high and loose the flow of the boat. (*i.e. be slower in the long run*) It is essential that you steer as perfect as possible. Bear off slowly to increase your speed when you need to accelerate!

This is a difficult area for sailors who have sailed Optimists. The Optimist is sailed flat and the boat points very high!

TACKING

It is important for all sailors to be able to tack in every wind and wave conditions. It is impressive to watch some Europe sailors who in a tack can gain both height and speed in every tack! The IYRU § 54 limits the benefits from a tack. You can not gain by tacking, but it is very difficult to prove. At least try not to loose anything while tacking!

The most efficient way to tack in light and medium air is to roll-tack. (*fig. 77+78*)

A roll-tack is divided into two parts:

Part 1: Luffing

Part 2: Bearing off

* Your body shall be located in a central position in your boat to easily adjust your boat without too big movements.

Movement 1 - Right before you start luffing up, heel your boat to leeward without losing height. The mainsheet = same as up-wind.

Movement 2 - The upper body should now be leaning to windward to increase the pressure in your sail and you get extra speed and time to move your body to the next position. At the same time, push your tiller slightly away from you. Main-sheet = loosen up.

Movement 3 - A windward heel shall last until your boom has passed the middle of your boat.

Movement 4 - When the boom is on its way past the middle, move over to the other side in a soft motion. It should be done so your sail gets filled on the new tack as fast as possible. Main-sheet = acceleration, i.e. pull in.

Movement 5 - Now first you pull the boat to windward i.e. flatten the boat.

Movement 6 - At the same time use the increased boat speed to luff up for a second.

Main-sheet = normal upwind tension.

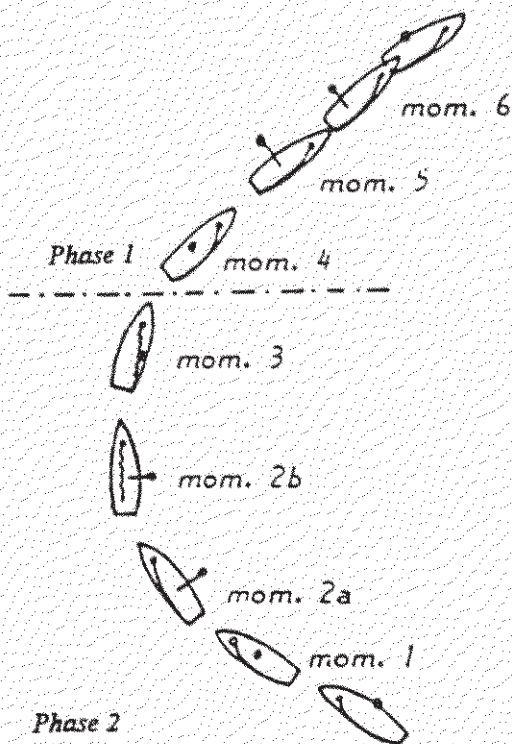
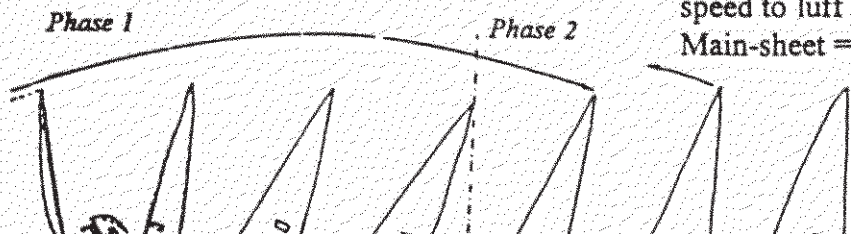


fig. 77



It is not only the body movement which is important in a tack. The rudder movements must be as small as possible, because the rudder works as a break on your boat if used too much.

The boat shall curve around in a tack and not turn like you are stuck in a corner!

DOWNWIND

The difference between reaching and down wind sailing depends on the angle of the reach. The angle also determines the body movements on the down wind legs.

On a reach in light air, it is important that the sailor is located on the traveler, as close to the centerboard as possible.

With your body far forward you will be able to get the stern out of the water. (*fig. 79*) In addition, such a body position will allow you to adjust your main-sheet easily. It is also essential to sit very still while sailing down-wind in light air.

The Europe dinghy can feel every movement of your body and every movement reduces your speed down-wind.

On a dead down wind leg is it an advantage to sit in the middle of the boat to have good control of the stability of the boat and you can adjust main-sheet and rudder easy.

In medium air and decreasing wind conditions, you can heel your boat to windward to move more sail-cloth further up in the air. In addition, you should move forward as far as possible. This combination will reduce the wet surface in the water and reduce friction. (*fig. 80*)

This is a question about feeling and something you need to practice to get comfortable with. In extreme light wind conditions is it often more important to get the sail to stay out and to get the right angle on the boom!

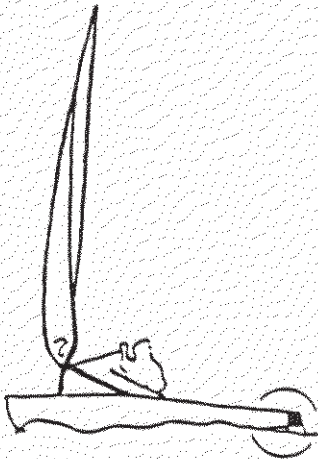


fig. 79



fig. 80

MEDIUM WIND

UP-WIND

When the wind and the waves increase the following adjustments should be done:

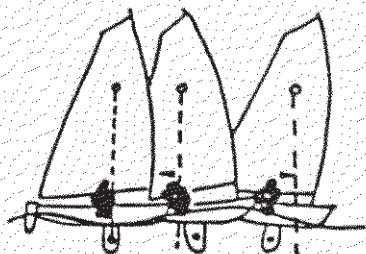


fig. 81

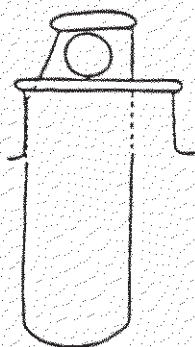


fig. 82

- * Place both your legs behind the traveler. Move your body in and out depending on the strength of the wind.
- * It is important to steer right. To be able to steer right, you have to have speed. Keep your boat flat and head up on the bottom of the waves and bear off at the top of the waves.
- * In cases where the waves break, it is often more important to bear off to avoid the wave. Look closely at every wave and determine what kind of wave you are faced with.
- * When the boat enters a wave, move your upper body back to get the bow out of the water. When you get to the top of the wave, move forward to your normal position or even a bit further (*fig. 81*).
- * These movements should also be done in light air in case of waves.
- * If the waves are very close, it is more efficient to move your body in and out instead.

Remember that too much body movement can reduce your boat speed and may not be within the rules.

In medium air it can be bad to keep the centerboard angled forward, because the boat automatically heads up into the wind and the waves. The boat will bounce and stop! Put the centerboard straight down (*fig. 82*). This will make the boat easier to steer through the waves!

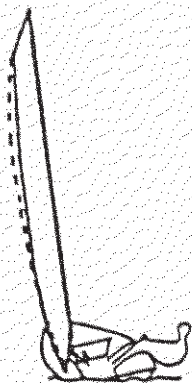


fig. 83

In medium air, you need to close the sail more to get more power and speed as the waves increase in size. By moving your mast a bit forward, you will reduce the twist as well as move the twist further up in the sail. (*fig. 83*)

The mast shall still be heeled back, but not as much as in light air.

The main-sheet has to be tighter to get more tension on

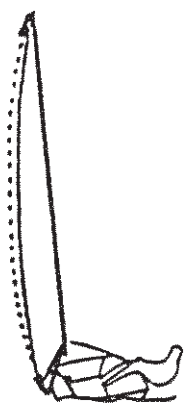


fig. 84

your leech. (*fig. 84*)

You have to let the leech twist out at the top of the sail!

To get the necessary power, you adjust the other control lines for the changing conditions. The control lines used most are the traveler, main-sheet and the sideways bend of your mast. The top of the mast shall give away sideways up at the top in the waves.

The mast bend is important in medium air because it determines the depth of the sail. The depth again decides your pointing abilities. If you tighten your cunningham too much, you might move the depth too far forward and reduce your pointing abilities. (*fig 85*)



fig. 85

With the help from the traveler and mast position, you can bend the mast and keep the leech at perfect tension.

The traveler is also a great tool to avoid using the main-sheet too much. The traveler has to be used in a relationship with the main-sheet. (*fig. 86*)

You need to be very alert with the trimming of your sail at the same time use your body and steer perfectly!



fig. 86

TACKING

The windier it is, the more extreme the roll-tacks will be. When it blows medium to heavy air, it is important to keep the boat flat and to tack at the top of the wave to use the down-hill of the wave to accelerate. (*compare with down hill skiing where it is easiest to alter course on top of the "mogul"*)

It is very necessary to time your tacks to be able to keep the speed through the whole tack. Your body has to move across the boat quickly but softly.

In all wind conditions is it mandatory to tack in a curve and not too fast!

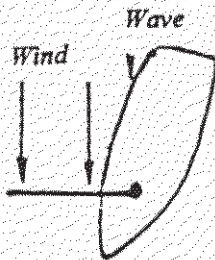


fig. 87



fig. 88

DOWNWIND

On the downwind leg, your biggest job is to try to use every wave to push you forward. You want to surf down in the same direction as the waves to accelerate as much as possible. The position of your body is a bit different in medium air compared to light air.

Now your body should be located either on the traveler or on the side tank. This of course depends on the wind-strength and size and direction of the waves. It is important to look for the down-hills of the waves so you alter your course to catch the waves.

To get on a surf and to stay on the wave, it is a must to steer correctly. As the wave is catching you try to lift your bow out of the water by pumping your main-sheet in once. This will increase the pressure in your sail and your boat will accelerate. According to IYRU § 54, you are only allowed one pump per wave to start to plane.

The wind always changes direction and velocity downwind. In some cases it might be necessary to sail a negative course. (*sail by the lee*) this is often done to catch more waves and to stay on the waves longer.

When you sail on a negative course, you get the waves in from the leeward side of the boat and you slide quickly downwind. (*fig. 87*)

If you sail on a negative course you can avoid using your boom-vang as much as a tighter downwind course. The reason for that is that the twist in your sail is increased. (*fig. 88*)

HEAVY WIND

UPWIND

The most important aspect of hard wind sailing is your ability to steer and hike properly. Your hiking and steering determine the pressure in your sail and you adjust the boat better if you hike your best. (fig. 89)

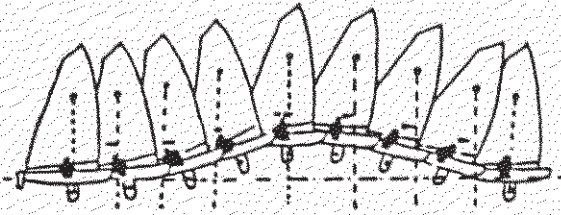


fig. 89

When you hike 100%, the centerboard should be in a heeled backward position as far down as possible but at the same time keeping the boat flat. (fig.90) This is to avoid the boat starting to pinch which is a natural process when the wind and the waves are bigger and stronger.

When you can not hike anymore, pick your centerboard up. This will reduce the heel on your boat. The Europe dinghy centerboard is very big and you can practice altering your centerboard even when the wind is lighter!

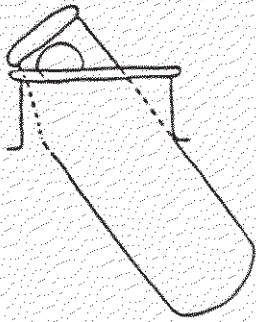


fig. 90

In heavy and extreme heavy wind you have to utilize the following technique:

As explained earlier in the book, the Europe dinghy should be sailed as flat as possible. But in heavy wind, most masts are too stiff, so it is impossible to sail with 100% power in your sail.

Instead you have to sail with your sail luffing close to mast. The reason for this is so you will be able to sail your boat as flat as possible. In addition, the angle of the wind is altered when you sail with your sail luffing which reduces the power. The waves also play a role in changing the angle the wind hits the sail with!

By bearing off and luffing up, the boat accelerates and slows down. At the same time, the boat is kept flatter. This is the reason why you always have to use your upper body to move in and out of your boat to adjust for the change in speed.

If you have problems with keeping your boat flat, you can pick your centerboard up 10-20 centimeters. You will lose some height, but you can easier keep your boat flat.

For sailors who have the perfect mast, sail, strength and technique for the conditions, they can move the mast further forward.

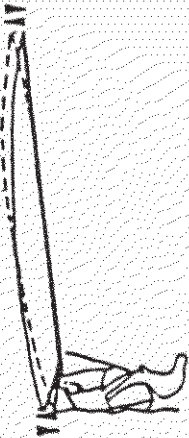


fig. 91

A normal mast should be straight because you need to use the main-sheet to flatten the sail and move the depth to reduce the power in the sail. This will again reduce the heeling over of your boat and you can sail your boat flatter!

It is almost impossible to sail your boat without feeling that your boat wants to head up in heavy air. The flatter you sail your boat the easier it is to sail your boat in a straight line. You can also open your sail to reduce the power by letting the traveler down. By moving the traveler to leeward, you open the leech and reduce the power which again allows you to sail your boat flatter. (fig.91)

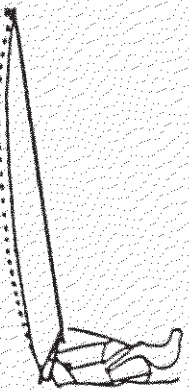


fig. 92

With the combination traveler and boom-vang you get a smoother course by opening up your whole leech. It is better to adjust the boom-vang and traveler than to loosen the main-sheet too much. By loosening the main-sheet you loosen the sail-cloth and you get a deeper sail. (fig.92)

For a sailor in a situation where the mast, sail, strength and technique is not enough, you will be better off by reducing the sail power through the traveler and boom-vang.

The sail has to open the leech until you are successfully sailing your boat flat. You can also move the mast back (i.e. mast step forward) to open up the leech even more, this will increase the twist and reduce the tightness of the leech, i.e. open the sail more.

By increasing the size and length of the twist, more and more power leaves the sail. (fig. 93)

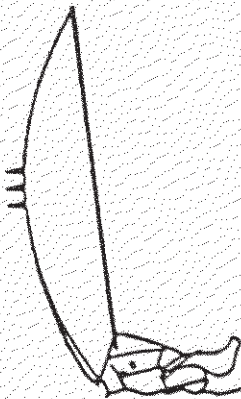


fig. 93

The problem is that the luff-curve is built with a certain amount of cloth to follow the bend of the mast. By tightening in the main-sheet and pulling on the cunningham, you do not decrease the depth close to the mast.

Instead your sail will get an increase in depth along the luff-curve, which will change your pointing abilities.

- You can not point as high as a result of an increase in depth by the mast which alters the angle of the wind which hits your sail. (fig. 94)

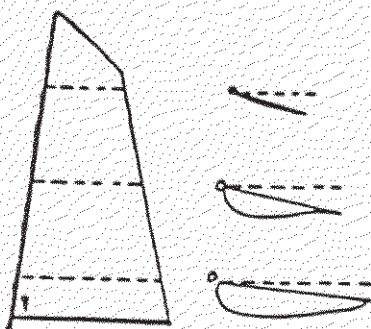


fig. 94

If the mast is too stiff, the problem will be approximately the same. You will feel this by not being able to point. The sail will start to luff close to the mast too early. - The sail is just too deep! (Sail cloth is too deep)

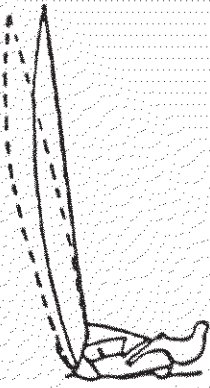


fig. 95

You have to take into consideration the mast and the sail as well as the sailor when deciding the right mast and sail combination.

Lighter sailors - usually females, use masts which are too soft. This is especially true when it comes to the side ways bend of the mast. It does not help to move the mast forward, because it will not alter the side-ways bend.

(fig. 95)

If you have such a problem, talk to your sail maker and ofcourse your mast producer. Changes have to take place!

DOWNWIND

In heavy wind is it essential to have balance in your boat and the sailor sits further back in the boat. This is the best way to get the bow out of the water and to avoid getting out of control.

Do not sit too far back, make sure you sit atleast 0.5 meter (or 2 feet) from the transom of the boat.

The down wind is not sailed straight down wind, but rather in a turning pattern to catch the waves. In addition, the change of course will allow you to increase your speed which will make the jibe easier and you stay on the waves longer.

When you get on a surf, look for the mark and steer straight towards it. This will allow you to get closer to the mark and you avoid jybing too much. This is the best way to utilize the down wind technique. *(Remember that the technique should steer your boat. The shape of the waves will depend on the wind and tide as well as your competitors.)*

If your boat becomes unstable and starts to heel to windward and goes back again repeatedly, you have an increased chance of capsizing.

In addition, it is not allowed to move the boom so much forward that the boat starts to roll back and forth.

If your boat starts to roll:

1. Push your centerboard down a bit.
2. Tighten your boom-vang.
3. Tighten your main-sheet

A reech in heavy wind is a question about bearing of to catch the waves and to stay on the wave as long as possible!

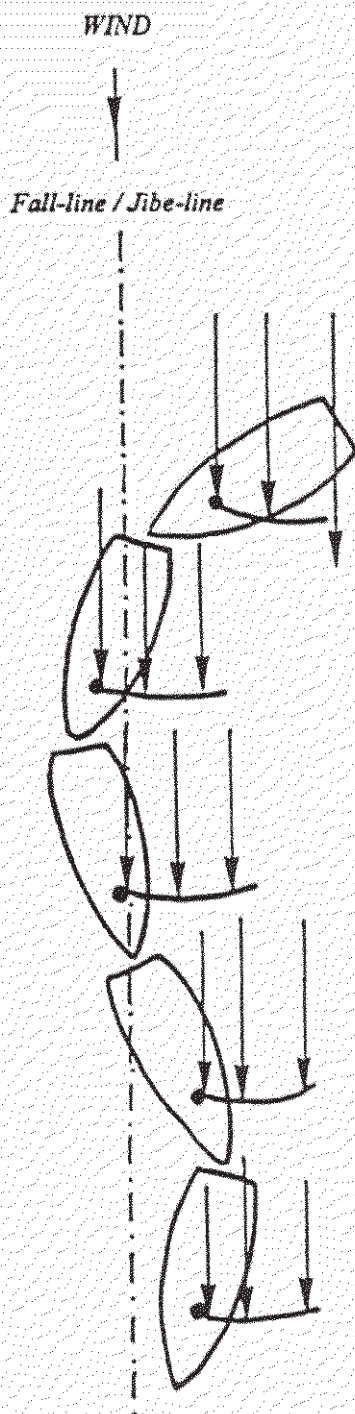


fig. 96

One alternative is to bear of and to let your boom out a little bit. A result of this is that the pressure in the sail increases and your speed is increased and you stay on the wave longer! (fig. 96)

You can also luff up to accelerate your speed and you can stay on the down hill side of the wave. When you feel that you are on a good wave, bear of and ride with it as long as possible.

Another way to catch a wave is to slow your boat down. Then you bear of on the border of jybing. The bearing of is the opposite force to slowing down. This can be done if you catch a wave from behind or you feel that you are falling of a wave.

By bearing of this way you can stay on a wave longer than you would be able to do by pumping!

It is important to know that you should only bear of enough to catch the waves. You do not want to go too far from the mark. Remember that the straightest way is the shortest way!

Use your body by moving it forward and back as well as in and out to get on the wave, - stay within the legal amount of body-movements.

Stear towards the deepest part of the wave infront of you!

If you loose a wave or slow down, you can gain speed by luffing up, by moving your body and by pumping. The combination of the accelerating tools will in most cases be your best solution.

In all wind conditions, think wave-down-hill. This is the fastest way on the down-wind leg.

The more you sail down-hill the faster you get there.

The down wind leg is no transportation part of the race, but rather a great opportunity to gain many boats if you work hard with your boat and use the waves the whole way!

JIBING

Remember that the Europe dinghy has a low and long boom. This can cause problems especially in the jibe. *(you might have already experienced that!)*

In most cases sailors alter the course too fast and the boom hits the water before the sailor is on the opposite side. This is especially true at the jibe mark where sailors jibe too fast.

- 1. Bear off and let your sail out so you go dead down wind.**
- 2. Prepare yourself by loosen the boom-vang a bit.**
- 3. Steer softly and start the jibe when you have the fastest speed on your boat. *(i.e. when you are surfing on a wave)***
- 4. Make sure you move fast across your boat and that you are ready to hike as soon as your sail is on the new side.**

It is essential that the boat is kept flat throughout the whole jibe. If you do not steer softly, your boat might start to rock back and forth. Tighten the boom-vang again!

It is much safer to tighten the boom-vang than to try to use your body opposite of the rocking movement!.

Chapter 6

IMBALANCE

Problems with the speed? - Problems with pointing
Or Problems with everything?

Then you need to look at each problem and work with it in
a systematic pattern.

- What kind of mast do you have? -Measure it!
- What kind of sail do you have? -Measure and compare it with the mast and see that they were built for each other.
- Does the rudder feel heavy?
- How do you work in the boat? - Are you working with enough force?
- Do you steer too much or too little?
- Is your wave-technique right or wrong?
- Are you in a pattern with your environment?

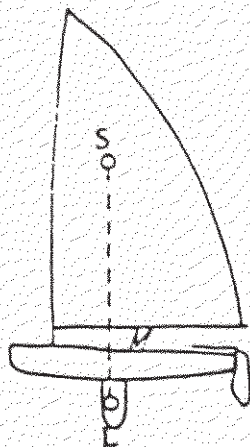


fig. 97

Solving these problems are not a questions about bla
and white but rather small adjustments and more practi.
The following tables might be able to get you on yc
way.

In most cases, the relationship between the sail pressu
(S) and the lateral pressure (L) will determine the succ
of your Europe sailing. (fig.97) This issue has be
covered in an earlier chapter.

With help from the following tables, you might so
some of your problems. Remember, there are no sho
cuts to good boat speed and balance. A coach can h
you, but it is the person in the boat who needs to fi
out what works for him or her.

Boat heads to windward too much?

Solutions:

S moves forward and/or L moves back.

S has to move forward and that can be done the following ways:

- * Move the mast forward and the sail pressure is moved forward.
- * Open the leech more by moving the traveler down.
- * Open the leech by loosening the main-sheet.
- * Pull on the in-haul.
- * Pull on the out-haul.
- * Pull on the cunningham.

L has to move back:

- * Centerboard is angled forward at the top and the board is angled back in the water.
- * Move the whole centerboard back in the centerboard-trunk.
- * Pick your centerboard up.
- * Move your body back.

Boat bears of too much?

Solutions:

S has to move back and/or L has to move forward.

S moves back;

- * Move the whole sail back by moving the mast back.
- * Close the leech by tightening the main-sheet.
- * Loosen the Cunningham.
- * Loosen the out-haul.
- * Loosen the in-haul.
- * Move the traveler closer to the middle of the boat.

L moves forward;

- * The centerboard is angled forward under water.
(as far back in the centerboard trunk as possible)
- * Move the whole centerboard forward.
- * Push the centerboard all the way down.
- * Move your body forward.
- * Allow the boat to heel to leeward.

Chapter 7

TRAINING FOR SPEED

LEARNING STAGE

When you train to increase your speed, it is important to be mentally prepared for such a task.

The following are necessary to be successful when training:

- * Concentration
- * Finding Solutions
- * Mental images of how it should be
- * Discipline

Training to improve boat-speed can be difficult because we do it all the time and you get into the same old pattern! But how often is speed training done the right way?

How often do you train with the other sailors without thinking about the purpose of the day?

Are they too good for you will you not benefit as much as sailing with somebody your level or a bit better.

Where are you in your learning curve?

- Are you a beginner?
- Are you a beginner in the Europe-dinghy?
- Can you handle the boat?
- Are you light, strong, heavy or do you have good endurance?
- Have you been in the Europe a long time and do you still have problems with speed?
- You can almost everything, it is just a matter of the day.

Where are you when it comes to speed? -What do you need when you train and how should it be done so you benefit the most?

How is your boat handling? Can you handle the boat? Can you handle tight situations?

Do you have enough acceleration at the starting-line?

Independent of trim and technique, you need to be able to handle your boat. A lot of this you can train on alone. Of course, tight situations can only be efficient if you have other boats around, but **go out in your boat and play!**

Speed training should be done with other boats in most cases. The following list will give some indications of what sailors prioritize when training for speed;

Mast-rake incl. leech tension	Approx. 80%
Main-sheet and traveler	Approx. 5%
Centerboard	Approx. 5%
Body position	Approx. 5%
Steering	Approx. 5%

95% of speedtraining takes place on the windward legs! (Why not downwind?)

A logical prioritizing should instead be the following;

	Light/medium air	Medium/heavy air
Mast-rake and leech tension	10%	10%
Main-sheet and traveler	30%	40%
Centerboard	10%	10%
Body position	25%	20%
Steering	25%	20%

Why are we so bad at training speed down-wind?

Ofcourse some sailors are good at training down-wind, but the average sailor does not spend enough time training down-wind.

GROUP TRAINING AND / OR TRAINING ALONE

Too often, speed-training takes place on somebodys "hip".

When you train in a group, little or small, the group needs to be as equal as possible when it comes to abilities as well as equipment.

- * Measure mast-rake backwards as well as to the side
- * Measure the sails
- * Analyze technique through using observation-schedules
- * Do it systematically

When training alone it is also essential to write down as

much as possible. Make your own training systematic!

One way of not being successful when training in a group or alone is the following:

Group-training automatically makes speed training faster than normal.

This can be good, but if speed is increased when you are using the wrong technique, you will not improve as a sailor.

You will then train using the wrong technique and it will slow you down when racing.

When you train alone, you will have more time to get the technique right and more automatic because you concentrate more on yourself than other boats.

This is the best way to get the right feel in your boat!

When you have a new sail, how do you get used to it?

Train alone to get familiar with your sail before you train with others. The time you need depends on how different the new sail is, and how experienced you are as a sailor.

Another mistakes:

The wind shifts all the time and when training speed, it is important to know if you are **being lifted or headed**.

Speed training is usually done by using a gate start to spread the sailors out.

If you are on a lift, the wind-ward boat benefits the most and will point higher and go faster than the rest of the boats. (*fig. 98*)

The opposite is true when you are on a header, where all the other boats will fall into the lee-ward boat. (*fig. 99*)

When this takes place, many sailors become desperate and make huge alterations to their equipment, often being destructive!

Before training speed, check to make sure the wind is stable. If the wind is not stable, take this into consideration when lining up and when concluding after the speed training is finished.

- Who is the fastest in the group?
- Who is pointing highest?
- Who is pointing lowest?

Make sure your conclusions are right and no hampered by other sources!

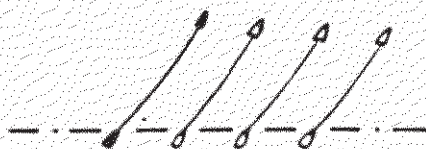


fig. 98



fig. 99

ANALYZING TRAINING - SETTING GOALS

Observation form

A good help when training is to utilize an observation form. This is especially true when you train in a group. *(Appendix)*

On the training form, it is easier to compare trim with others as well as with other times you have been out in similar conditions.

Example;

1. State the goal of today's training, i.e. using main-sheet right.
2. Split the group up so some sailors look and observe while others sail.
3. Conclude in the group what is too much and too little main-sheet tension.

The observation form is made so that each sailor can write his/her own comments. It is essential that each sailor write down how they felt, because the feeling is always different among the sailors.

The sailor who makes the observations writes down a minus or a plus for every time he/she observes the other sailor. If the observer looks at the sailor 32 times and write down a plus 29 times, the sailor has his/her main-sheet on an average too tight.

It is easy to observe the sailor many times during a stretch or even during a race.

This is a way you can observe everything in the boat:

- traveler adjustments, steering, hiking position, leech-tension, body position and so on.

With a observation form, you can conclude that the observations have been "objective".

Another way to work on observation is by using a video camera. Anybody can film the sailors and you can spend a lot of time going into details after sailing.

In addition, you can save the video and compare yourself with last year. This is a great way to see your improvements!

Film the best Europe sailor ...

to see what you can learn from the best sailors.

The most important task for you is how you can improve as a sailor. After a while with lots of training, use the observation-form and or video again to see if you have improved and make your conclusion after that!

Training-diary

To analyze the areas where you are not as good as you could be is an important aspect of training. How you analyze this varies, but 8 out of 10 sailors just do things without thinking too much about why and how changes should occur.

A great help is a training-diary. How the training-diary is and what it looks like is not that important as how it works for you. The most important issues to write down are trim and technique that you experienced on the water, either you or what you observed.

Ofcourse, there are great sailors who do not write anything down, but they might have the ability to concentrate extremely hard and feel they do not need it. Intuition is it called when a person can remember by feel. Instead of depending on intuition, be on the safe side and write things down. You will not only help yourself, but you may want to coach in the future, and you can use these notes later!

BALANCE AND SPEED - A QUESTION ABOUT FEELING

Balance in the boat is a question about feeling and for some sailors it is just there.

For others, it needs to be worked in and the more you work the more comfortable you will be. Others will never get the feeling...

Body comfort (*knowing how your body reacts*) is a task that you are taught when you were younger.

For example, ball-handling is a learnt task, but you pick it very fast at a young age.

Sailing is no exception, it has to be learnt and practised to become natural at doing it. Body work in waves is definitively a taught task, but the feeling can not be taught.

How comfortable you are with your body decides how well you will find the rhythm in your boat.

Do you have bad body-comfort? Train it!

On good example is the great American Laser sailor John Bertrand who before the Laser

Worlds at the end of the 1970s practised more jazz dance than he sailed the last year before the worlds!

This was done to increase his body comfort and rhythm.

He won the worlds and introduced roll-tacks!

Hans Wallén, the Swedish Star Champion was a super Optimist talent in the 1970s. He won the Optimist Worlds twice and the Europe Worlds his first year in the boat!

He did not win all this because he was a natural when it comes to his body comfort.

He trained balance and body-comfort by cycling on a one wheel cycle many times per week!

During the many years I have spent travelling with the different national teams to regattas all over the world, I have come to the following conclusion. The sailors who have the best speed, technique, especially down-wind are great dancers at the disco! The sailors who are lacking speed are often a bit more "clumsy", atleast when it comes to dancing!

This conclusion does not mean that you should go to more dances and spend all your evenings at the disco in town. It is just an observation that rhythm and balance can be taught and learnt by just spending time and letting yourself learn.

Downwind sailing is a question about balance and feel for wind and waves. You need to be good at both, to sail fast down-wind.

When you sail down-wind, you might limit yourself too much by rule 54 and you end up not working at all!

In my job as a coach, I might think too much about rule 54. Today I have stopped thinking about IYRR Rule 54 when we are learning down-wind sailing.

The first issue is to use the waves and the wind as much as possible, the more the better, regardless of rules.

When you get the feeling, and you get on the waves, then you can become concerned with the IYRR Rule 54.

To pump and to work so you are able to stay on the wave or to catch a new one makes it easier to get the full benefit of the down wind leg and the "transportation" part of your

The most important issue is that you pump and move properly within the rules. When you break IYRR 54, you often go slower than you normally would if you stayed within the rules!

By pushing the limits when you learn to go down wind, (*i.e. pump and work more than IYRR 54*) you learn to really work your boat and get the rhythm and balance easier.

IYRR 54 has changed in the last 4 years. In most cases, you will get a yellow flag and can do a penalty to free yourself. Earlier, a disqualification for IYRR 54 could not be dropped in the series and your regatta would be over.

There are also a few other limitations within the IYRR Rules. For example, "You can not have greater speed coming out of a tack than you went into the tack".

In extreme light air it is a bit easier to prove this, but in medium and other wind conditions, it is much more difficult....

FINAL WORDS

As you probably have realized by reading this book, there are a lot of things you can work on.

There are some sailors who are spoiled by having a coach at every practice and at least 10 boats on the water.

In addition, some sailors believe that sailing alone is not worth the effort, but that is not true!

If you want to get as good as you possibly can and are willing to become, you need to work alone as well as in a group.

Concentration is easier when sailing alone and is a definitely and important part of sailing.

Also remember that Europe sailing is an individual sport and that your success or failure are a result of your own effort and knowledge.

Finally - I hope that you can utilize this book and get some new ideas or just get back on the right track.

I hope you can now be twice as fast as you used to be.

Twice as fast going the right way?

Well, that is another story!

APPENDIX

Appendix 2

TRAINING -DIARY

SPEEDTRAINING

Date: _____

UPWIND
 REACH
 DOWN-WIND

WIND m/sec.
 Gusty
 Stable

WAVES Short
 Long
 Flat

SAIL _____

MAST _____

TRIM

FUNCTION	Trimscale / Windspeed / Waves			
	Starting- point	Decrease	Increase	Finnish point
Mastposition				
Sheet				
Out-haul				
In-haul				
Cunningham				
Bom-vang				
Traveler				
Centerboard				
Rudder-balance				

TECNIQUE

FUNCTION	Starting-point	Decrease	Increase	Finnish point
Body-position up-wind				
Body-position down-wind				
Hiking				
Steering				

RESULTS:

NEXT TIME:

