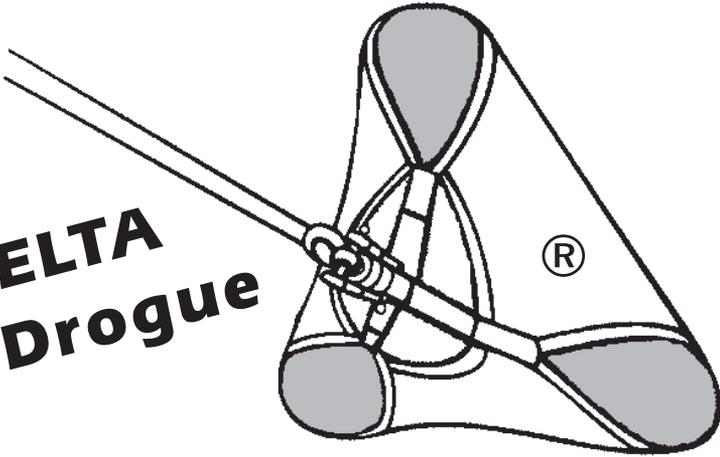


Instructions for using your

PARA-TECH ®

**DELTA
Drogue**



Manufactured by:

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“Eternal Father, strong to save, whose arm has
bound the restless wave, O hear us when we
cry to thee, for those in peril on the sea!”

William Whiting

SYNOPSIS AND OVERVIEW:

SAFETY FIRST!

Thank you for purchasing one of our Delta™ Drogues. PARA-TECH® Engineering is in business to enhance offshore safety. Please do your part to promote, encourage and reward good safety habits on your ship! Set a good example by wearing your own life jacket on board. Practice man overboard drills. Review all safety matters with your crew. Do they know how to find and use the fire extinguishers? Will they be able to use the VHF to summon aid on their own? . . .

NEVER TAKE ANYTHING FOR GRANTED AT SEA

Offshore safety is many things, but first and foremost it is that conservative attitude of mind that never takes anything for granted at sea! In particular, never take your Delta™ Drogue for granted. Remember also that drag devices are mere aids to seamanship and **only as safe as those who use them**. Remember also that different types of boats will react differently to different drag devices. The individual user should take care to determine prior to use that this drag device is suitable, adequate or safe for the use intended. Since individual applications are subject to great variation the manufacturer makes no specific representation or warranty as to the suitability or fitness of the devices for any application. Take note that drogues are capable of pulling loads measured in tons, so all lines must be properly coiled beforehand! **Stand clear of the coils as the rope is paying out!**

PARTICIPATE IN THE DRAG DEVICE DATABASE PROGRAM

Our mutual association with offshore safety is an ongoing one. It doesn't end after the sale. The founder of PARA-ANCHORS INTERNATIONAL has instituted a comprehensive program to catalog, preserve and publish accurate information about instances where sea anchors and drogues have been used. If you have occasion to use your drag device, **please fill out and return the DDDDB form that was enclosed with it**. An ever growing data resource such as this will-in time-be productive of critical insights into heavy weather tactics and go a long way toward enhancing offshore safety for all mariners. Your feedback, your opinions and your observations, regardless of how insignificant they may seem, are of vital importance to the concept of offshore safety as a whole. Working together we **CAN** prevent tragedies such as Fastnet '79. **We WANT TO HEAR FROM YOU!** Keep in mind that this manual was written using input from the Data Base

We wish to extend special appreciation to Victor Shane, author of the DDDDB for permission to use figures and illustrations in this manual.

FAIR WINDS & FOLLOWING SEAS!!



Don Whilldin, President
PARA-TECH® Engineering Company

TABLE OF CONTENTS

- I. SURVIVAL: The Mind-Set**
- II. SPEED - LIMITING DROGUE**
- III. FOUR USES FOR DROGUES**
- IV. DELTA™ DROGUE SIZING**
- V. RODE**
- VI. BRIDLES**
- VII. PREPARATION**
- VIII. DEPLOYMENT**
- IX. TECHNIQUES**
 - A. MINIMAL STEERING**
 - B. CONSIDERABLE STEERING**
 - C. OPTIMAL STEERING**
- X. RECOVERY**
- XI. CARE & MAINTENANCE**
- XII. WAVE PARTICLE ROTATION**
- XIII. SUMMATION & THE DRAG DEVICE DATA BASE**

Survival!

THE MIND SET

In as much as drag devices are liable to be used in extreme conditions, perhaps we should digress briefly to mention a thing or two about the all important mental aspects of survival (forewarned is forearmed!). Coast Guard, Navy and Air Force survival experts agree that there is no underestimating the role that the mariner's state of mind plays in his or her survival. "**Attitude is the main thing,**" said Mike Munroe, who survived the 165 knot winds of Hurricane Allen (1980) in a Givens life raft.

While rescuers have marveled at the tenacity demonstrated by some survivors, they have also been perplexed and disturbed by those who seem to capitulate and give up with little struggle, evidently the sheer will to survive having been the major determining factor between life and death itself! "**It's a very hard thing to define, the will to survive,**" said retired Coast Guard search and rescue chief, John Waters (March 1988 issue of SOUNDINGS).

Accordingly, we advise mariners who venture offshore to be always mentally disciplined for survival at sea as the Green Beret is disciplined for survival in combat! To quote the last paragraph of the inquiry on the Fastnet Tragedy of 1979, ("**In the 1979 race, the sea showed that it can be a deadly enemy and that those who go to sea for pleasure must do so in the full knowledge that they may encounter dangers of the highest order**").

If you are caught in a survival storm, it's "**BATTLE STATIONS**" for everyone. Take charge of the situation and rule your ship with an iron will. Batten down the hatches (use hammer and nail if you have to). Jettison all potentially lethal flying objects from the cabin - **THROW THEM OVERBOARD!** Set your house in order and dig in for the battle to survive **COME WHAT MAY**. Establish a strict schedule for keeping watch and getting rest. Appoint a similar discipline for eating. Avoid binging on food and **avoid beverages containing alcohol** (the poison that weakens the will). **KEEP BUSY**. Man the pumps. Repair damage as best as you can, stay sober, post watch, pray, and never **-NEVER-** give up. Enforce a positive attitude, avoid despair like the plague, and don't allow doubt and resignation to set into your crew. Not even for one second.

STAYING WITH THE BOAT

STAY WITH THE BOAT, until there is not one iota of a doubt in your mind that she is in fact going to sink. Remember Fastnet '79?? In that tragic race, twenty four yachts were prematurely abandoned by their crews, which climbed into rubber life rafts believing that their vessels were about to sink. Astonishingly, however, **ONLY FOUR OF THOSE YACHTS WERE ACTUALLY SUNK BY THE FREAK STORM,** and whilst many souls perished in those rubber life rafts, (some of which split apart at the seams) **NINETEEN** of those empty, abandoned boats were found to be intact and still floating, **AFTER** the storm had passed on. . .

SPEED-LIMITING DROGUE

A speed-limiting drogue is towed off the stern. Its purpose is (A) limit the speed of the boat, (B) reduce her angle of yaw and (C) provide for steering assist in strong following seas. It is a LOW PULL device that allows a fair amount of directional control through the helm. You can, and may have to, steer the boat with the drogue in tow. It follows that there is a "Catch 22" associated with any speed-limiting drogue: *The same low pull that allows for steering control may also allow the boat the broach, capsize and pitch-pole in the heaviest seas.* The forces that pitch-pole yachts are formidable enough to yank the drogue through the water in the course of throwing the boat end-over-end. Sailors should be aware of this "Catch 22" and make allowances for it in the course of their decisions at sea.

WARNING: *In all likelihood the insufficient drag of a speed-limiting drogue will not prevent pitch-pole in the heaviest storms, especially those packing ESW's (Extreme Storm Waves), rogues, and "Three Sisters" type developments.*

FOUR USES FOR DROGUES:

- 1) The above notwithstanding, speed-limiting drogues can be of immense value in strong following seas and have been used to stabilize the attitude of small craft since antiquity. No doubt there are many yachts sailing today that would have gone down had it not been for the grace of GOD and some sort of drag device that slowed them down.
- 2) Towed off the stern with a bridle a speed-limiting drogue can be used as an emergency steering device in the event of steering failure by adjusting the lengths of the bridle legs to generate yaw.
- 3) Towed off the windward quarter a speed-limiting drogue can be used to help maintain directional stability while negotiating dangerous harbor entrances.
- 4) Towed off the stern of a vessel in tow a drogue can all but eliminate the dangerous "whiplash" effect when the towing boat slows or stops.

On a downwind leg in stiff Trades, for example, a speed-limiting drogue will turn an uncomfortable roller-coaster ride into a "Sunday Afternoon sail".

Properly deployed, a speed-limiting drogue will significantly increase the efficiency of your autopilot. Used in conjunction with a bridle it may allow you to go below and get some rest. Used without a bridle (with the towline brought well forward of the rudder) it may allow you to steer through an arc of 90 degrees, usually enough to help you avoid obstacles, headlands, etc.

DELTA™ DROGUE SIZING

Delta™ Drogue sizing is based on boat length and the suggested sizes are baseline only. If you prefer more drag, to go slower, go a size larger. If you prefer to go faster (less drag) go a size smaller. Keep in mind that a drogue is a low pull device and smaller is better (the opposite is true for a Para-Tech Sea Anchor). *Size recommendations are:*

- | | |
|----------------------------|-----------------------------|
| 36" For boats up to 25 ft. | 96" For boats up to 55 ft. |
| 48" For boats up to 35 ft. | 114" For boats up to 65 ft. |
| 72" For boats up to 45 ft. | |

RODE

The minimum recommended rode size for Delta™ Drogues up to 72" is 1/2" and the minimum for the 96" and 114" is 5/8". We recommend that a stainless steel thimble be installed in the end to be attached to the drogue swivel. Depending on the rode size you may need to use a bow shackle to attach the rode thimble to the drogue swivel. Alternately, tie the rode to the shackle with a clove hitch and two half hitches and seize the free end with stitching or tape. Length should be a minimum of 200 feet and should be adjusted so the boat and drogue are on the same wave frequency (both in the trough or on the crest at the same time). See HAZARDS OF WAVE PARTICLE ROTATION. We recommend a section of chain be attached between the rode and drogue to help it ride below the surface.

BRIDLING

The use of a bridle is highly recommended. A bridle can be assembled before setting out. We recommend the legs be at least 50 feet long to allow for continuous adjustment. The best way to use a bridle is to route them through chocks at the stern and secure them to winches on either side of the boat. This way you can also adjust for wave frequency. A bridle is a must in using your drogue as an emergency steering device. A makeshift bridle can be rigged while towing the drogue by attaching a second length of line. It should be attached with a rolling hitch, cleated off to the other side of the boat and then letting out the primary rode to create the bridle.

PREPARATION

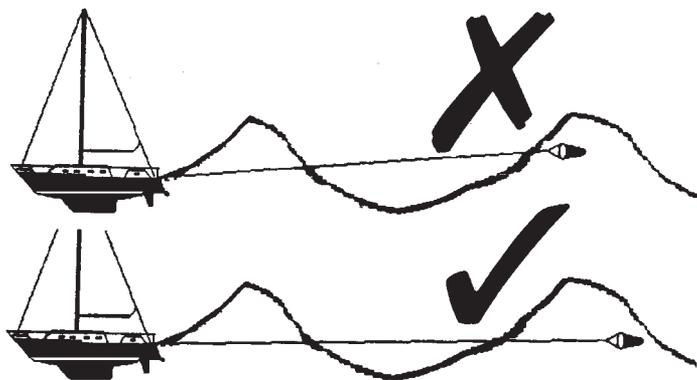
When you first pull your Delta™ Drogue from its stow bag you will find it has a swivel attached to three lines. Make sure the three lines are not tangled before you attach your rode. Attach the rode and 10 - 20' of chain to the swivel and then restow the drogue in its bag. Stow the rode for quick deployment and **MAKE SURE** it is cleated off. **NOTE:** Stow the rode in such a manner that when you deploy the drogue everything is **OUTSIDE** of the rails.

DEPLOYMENT

Deployment is extremely simple. First **MAKE SURE YOUR RODE IS CLEATED OFF**. Next, take the Delta™ Drogue from its stow bag and throw it in the water off the stern. The opening "shock" is very gradual and you most likely will not experience any kind of jerk, just a strong tug as the Delta™ Drogue catches water and begins to pull. Once deployed employ chafe gear (this is **VERY** important) and relax.

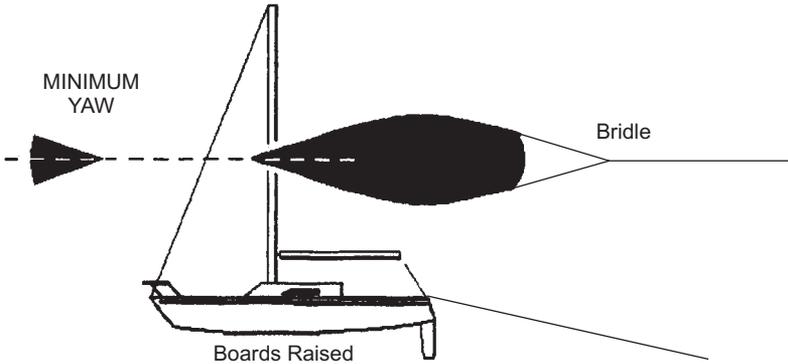
TECHNIQUES

Try to position the drogue behind the wave so that it will not pull out. When the boat is moving down a crest the drogue should be behind a matching crest so that it is pulled through the meaty part of the wave and not in thin air. This is important because drogues have been known to pull out of wave faces. When this happens the towline goes slack, the boat will take off in a sprint, may yaw, broach, or capsize, and when the drogue finally takes hold again it may wrench something out of the deck or cause itself irreparable damage. Use chain in the rode to keep the drogue below the surface. Use enough to keep the drogue well below the surface, about 10 - 20' attached at the drogue swivel.



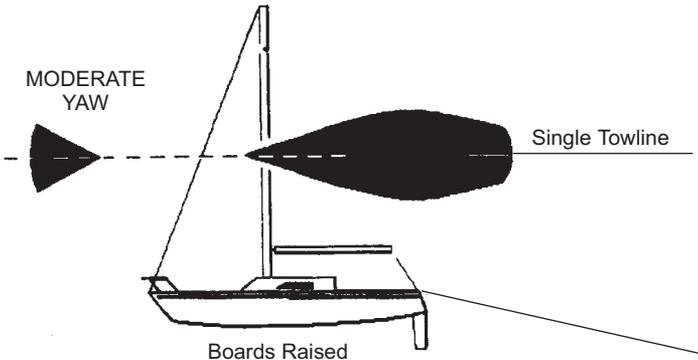
MINIMAL MANUAL STEERING

Shorthanded? Tired? Use a bridle off the corners of the transom. Be sure the attachment points are as far aft and outboard as possible. **Raise all board/s.** You may be able to leave the helm unattended using this formula. **CAUTION:** this bridle system will not allow the boat to be freely steered.



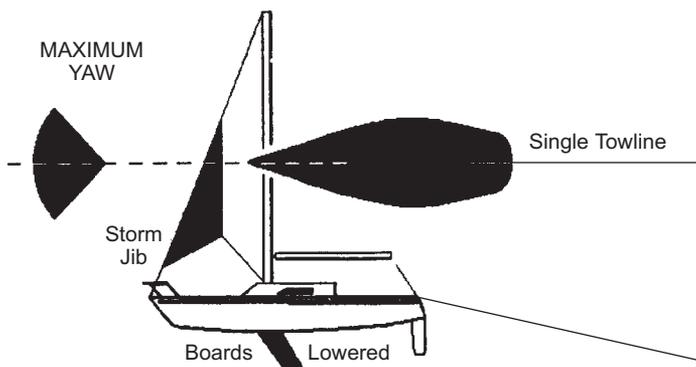
CONSIDERABLE MANUAL STEERING

Have to steer? Do not use a bridle, but bring the towline to a cleat/winch **well forward of the rudder.** Multihulls should bring a **single** towline to a centrally located cleat forward of the rudder. If the boat is well crewed, if it is advantageous for you to steer the boat, this is the formula to remember.



OPTIMAL MANUAL STEERING

Add a storm jib to the above, and **lower all boards**. With the towline attached well forward of the rudder, with a storm jib set and centerboard/s lowered you should be able to steer through an arc of 90° (45° per side), usually enough to help you avoid navigational obstacles, headlands, etc.



RECOVERY

To recover your drogue you must either come to a stop or, if you have cleated off to a cockpit winch you can winch it back on board. Once it is next to the boat pull it out by one "corner" to spill the water and pull it aboard.

CARE & MAINTENANCE

Your Para-Tech Delta™ Drogue is made of very durable vinyl coated nylon fabric. When not in use you should keep it in its stow bag and out of direct sunlight. As soon as possible after use it should be rinsed thoroughly with fresh water, allowed to dry and then re-stowed in its bag. If you are unable to rinse we recommend you stow it wet and keep it wet. Abrasive salt crystals are formed when salt water is allowed to dry and by keeping your drogue wet you will prevent them from forming.

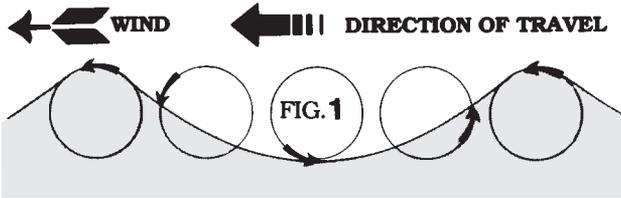
If your Delta™ Drogue ever needs maintenance or repair we recommend you return it to the factory for this service.



CAUTION

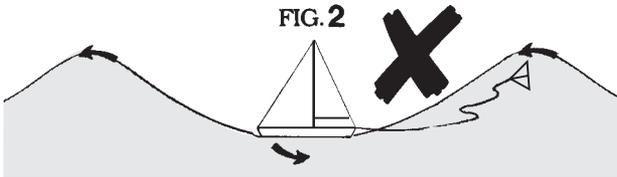


HAZARDS OF WAVE PARTICLE ROTATION



TROCHOIDAL WAVE THEORY, (from the Greek “TROCHOS” meaning “WHEEL”). The diameter of the “wheel” is equal to the height of the wave. The period of the wave determines the time it takes for the wheel to make one revolution. The approximate rate at which the water molecules rotate at their orbital (surface) velocity can be determined by dividing the circumference of the wheel by the wave period.

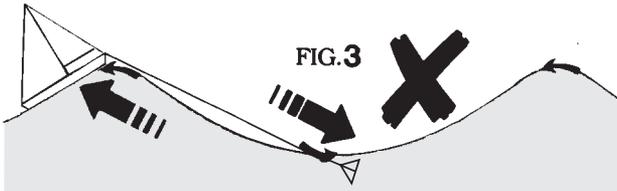
CAUTION!



CAUTION!

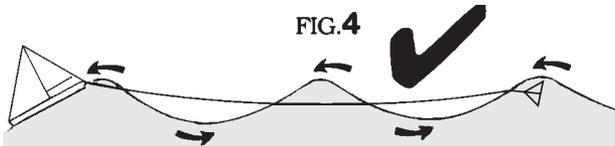
INCORRECT RODE LENGTH (TOO SHORT): Molecular rotation upwind in the trough and the corresponding rotation downwind on the crest cause the boat and the drogue to momentarily converge.

CAUTION!



CAUTION!

INCORRECT RODE LENGTH (TOO SHORT): Molecular rotation downwind on the crest and the corresponding rotation upwind in the trough cause the boat and the parachute to momentarily diverge (move apart). Note also how the inadequate rode length causes the drogue to interfere with buoyancy of the yacht as well, **ALL IN ALL A POTENTIALLY DISASTROUS SCENARIO.**



CORRECT RODE LENGTH: The long rode leaves the boat free to rise/move/rotate with the seas, and by stretching acts as a “buffer” to absorb much of the peak divergence loads; notice how the rode has been finely adjusted so that the boat and the drogue are rotating in unison on their respective waves.

(Note: For the actual speed of molecular orbital motion as it relates to sea anchoring, see Shewmon paper entitled “SEA ANCHOR-RODE FACTS”)

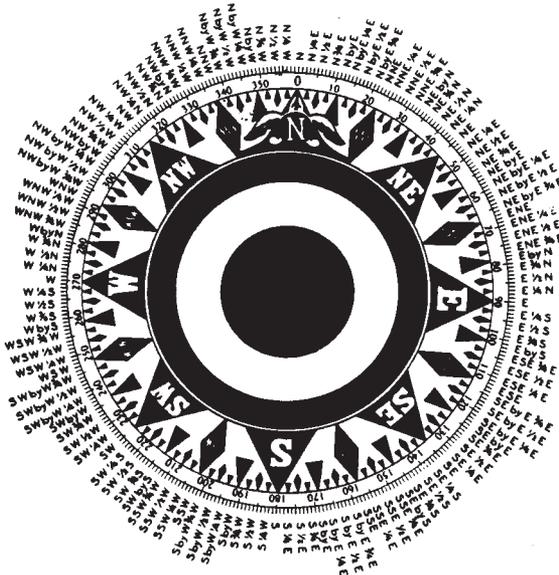
IN SUMMATION

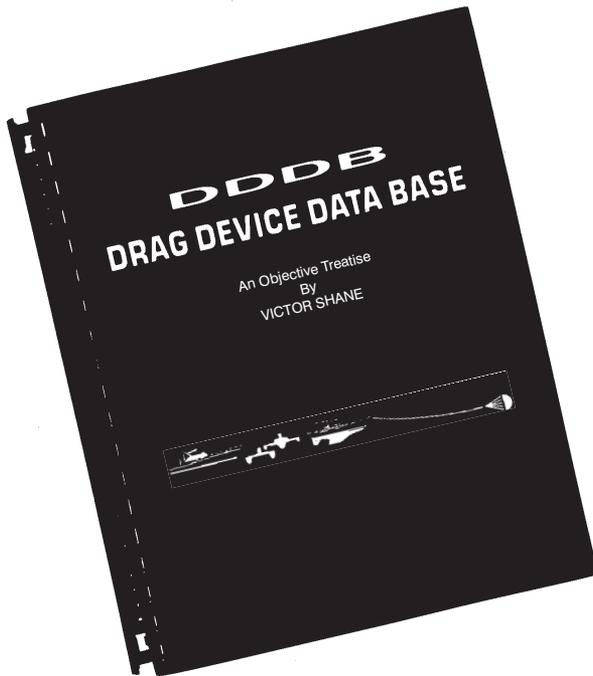
More and more small boats are putting out to sea nowadays, seeking independence of a higher sort, as well as a measure of relief from a world in turmoil. Of these, the majority are disillusioned in short order, their preconceived notions about calm seas, balmy breezes and swaying palm trees rudely displaced by the harsh realities of ocean crossing.

Happily, however, there are also those, who rise to the occasion, meet the challenge head-on, survive it all and return. These are a rare breed, whose lives have been intensified by the encounter with the sea, and whose very souls have been made to conform to higher codes of self-discipline and liberty. Ask any one of these whether the whole thing was worth it, and the majority will tell you, YES, it was all worth it, and that the rewards of such epic endeavors are ample and enduring in every respect.

Harbor no illusions about the unpredictable sea. To quote the words of Webb Chiles (who has one of our Sea Anchors on board "Resurgam"), "The fallacy is in expecting anything at sea to be as it 'should be'." Indeed there are no guarantees out there, and we cannot offer you one, implied or otherwise. What we do offer is the experiences other mariners who have benefitted from our sea anchors, and a long term program (the "DRAG DEVICE DATA BASE") that catalogs and disseminates accurate information about drogues and sea anchors.

It only stands to reason that as more and more heavy weather files are added to the database, the pieces of the jigsaw puzzle will slowly fall into place, systematically increasing our knowledge on the subject of offshore safety, and this in itself is a good and worthwhile cause to contribute to, as we go sailing across the oft hostile interfaces between sea and sky with all of the uncertainties — and challenges — that they still hold for the contemporary mariner.





PARTICIPATE IN THE DRAG DEVICE DATABASE PROGRAM

The **DRAG DEVICE DATA BASE** was originated by Victor Shane, founder of **PARA-ANCHORS INTERNATIONAL**. This revolutionary idea brings together sailors, editors, experts on safety and draws from their knowledge and bluewater experience to enhance offshore safety for all mariners, while its companion publication collects and catalogs accurate files on instances where drogues and sea anchors have been used in heavy weather (copies can be purchased through **PARA-ANCHORS INTERNATIONAL**).

If you have occasion to use you drag device, please fill out and return the **DDDB** that was enclosed with it. **THANK YOU!**



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