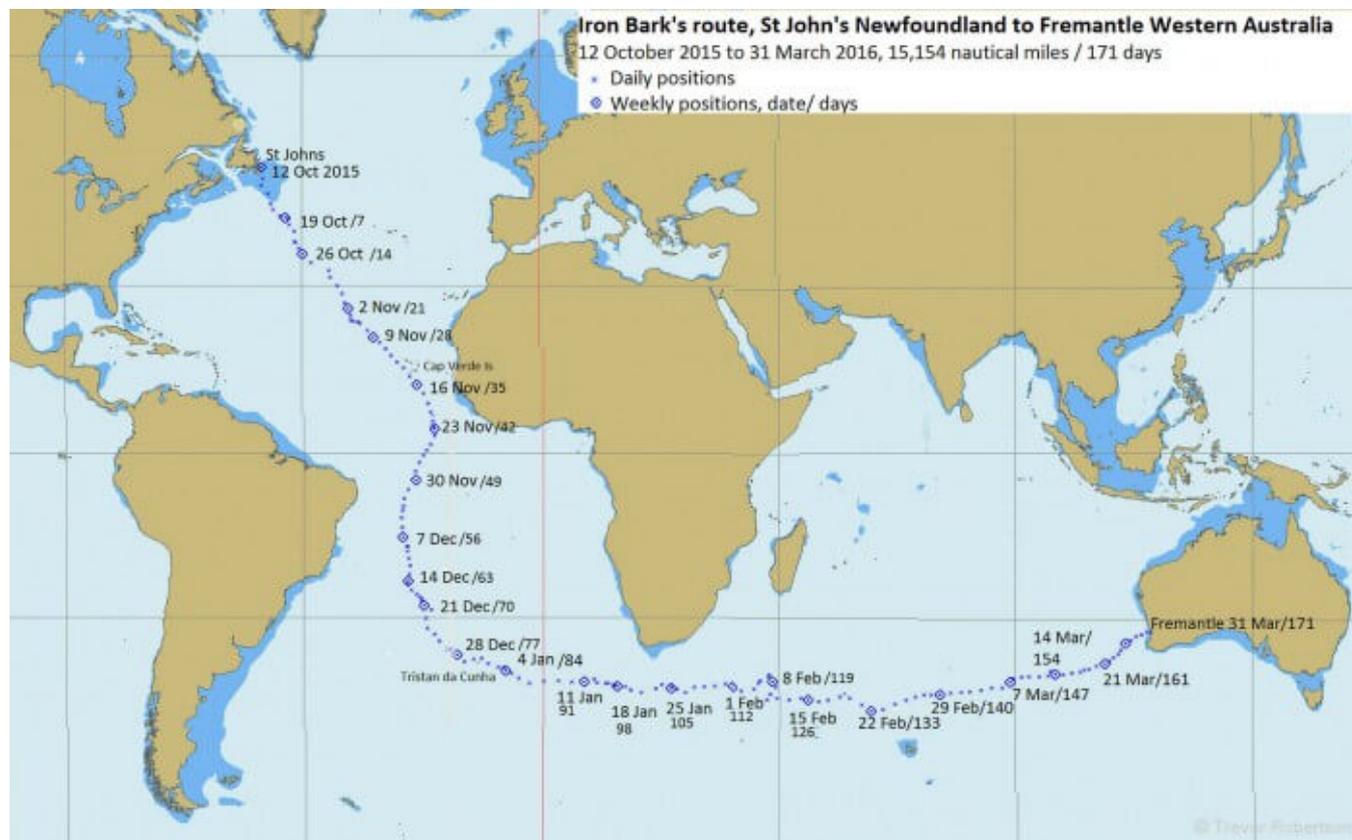


Battle Testing a Jordan-Designed Series Drogue

Trevor Robertson Published May 19, 2017 [42 comments](#) Updated July 1, 2017



Trevor's voyage of 171 days, his first with a series drogue

In 2015 I bought a Jordan-type series drogue for *Iron Bark*, my 35-ft Wylo-class steel gaff cutter, designed by the inimitable Nick Skeates. She displaces 11 tonnes so the drogue is 97-metres long with 124 cones, as recommended. The drogue was supplied by [OceanBrake](#).



"Iron Bark" in gentler climes off Tahiti

The cones are made of a heavy cloth with a rubberised backing, seamed all round with heavy tapes well sewn on. The bridle and first section of the drogue are 18-mm double-braid nylon with a tail of 14-mm nylon double braid. The splices, seizings and attachments of the cones are all strong, neat and seamanlike.

I thought the whole thing to be exceptionally well made and fairly priced.

Since fitting the drogue I have sailed from Scotland to Newfoundland and Labrador, then south down the Atlantic and around the Cape of Good Hope to Australia, and on to New Zealand, with a diversion to Australia's tropical north coast along the way. **During that time I used the drogue on six occasions.** Here is what I learned:

The passage from Scotland to Labrador by the northern route, passing just south of Iceland, produced no wind above 45 knots, which *Iron Bark* rode out hove-to without resorting to the drogue. Similarly, there was nothing

on the passage south down the North and South Atlantic that could not be dealt with by heaving to. It was not until I was south of 40°S and in the Southern Ocean that I first deployed the drogue.

First and Worst

About 435 nautical miles south-southeast of the Cape of Good Hope, in 41°S, 024°E, I ran into an eddy of the Agulhas Current that set northwest at between 3 and 4 knots. This was directly into the wind and predictably produced a lumpy, unpleasant sea. While the wind was moderate this was merely uncomfortable, but the barometer was falling.

The promised gale arrived just after dark and in 20 minutes the wind increased from south force 6 to west storm force 10 (25 knots to 45-55 knots). It was a scramble to strip all sail and run off downwind under bare poles.

The Aries wind vane was unable to prevent *Iron Bark* from broaching in the steep, breaking seas even after the wind eased to a gusty force 8-9 (35-50 knots), so I streamed the drogue for the first time.

Deployment



I used chain for the tail weight as it is easier to stow, deploy and retrieve than an anchor or a pig of lead

The drogue was stowed in a large sail bag with the weighted end on top and the two ends of the bridle showing. I hauled the bag onto the deck, looped

the bridle legs over the bollards on *Iron Bark*'s quarters, dropped the weighted end overboard, and the whole thing ran out quickly. It is essential that it runs out cleanly since once the first few metres are in the water there is enough strain on everything **for any snarl to be a serious matter.**

I should have had this drogue years ago...

The effect was immediate; *Iron Bark* slowed from 3 knots to a little over 1 knot and ran steadily downwind with the rudder lashed amidships. Despite hard knocks from cross-seas there was no sign of broaching. There was nothing more for me to do **so I went to bed; I should have had this drogue years ago.**

Wind Against Current

Overnight the current dragged *Iron Bark* 27 miles directly into the wind although she was running downwind at over a knot—the average current was 3-1/2 knots. **The effect of such a current on a gale-driven sea is better imagined than experienced.**

Steering line



Before deploying the drogue I tied a stout rope to the junction of the bridle legs and the drogue leader. This third leg to the bridle is a lazy line that I kept under just enough tension to stop it fouling on anything without taking any strain. The line makes it easier to get the first few metres of the drogue in on retrieval, but its chief function is to allow me to steer across the wind by up to 30°.

An Interesting Modification

To steer across the wind I take the tension on the lazy line, slightly shorten the bridle leg on the side that I want to turn towards by taking another turn of the bridle around the bollard, then ease off the lazy line. The slightly asymmetrical bridle legs steer *Iron Bark* across the wind, letting her take cross seas on the quarters.

In the southern hemisphere the wind shifts abruptly from northwest to southwest on the passage of a cold front (warm fronts are almost unknown

in the Southern Ocean). Running before the new southwest wind puts the old northwest sea abeam, which can be dangerous for a few hours until the northwest swell eases.

Taking the old sea on the port quarter and the new sea on the starboard quarter is safer and more comfortable. As the old sea dies away and the new sea builds up, course is altered to run more directly downwind by lengthening the shortened bridle leg. Lashing the tiller across helps, too.



Retrieving the drogue showing turning block forward

Retrieval

When the wind eased to 30 knots I set about getting the drogue back aboard. The system that I found worked best was to tie a retrieval line to the drogue with a rolling hitch, then lead that rope through a substantial turning block attached well forward and back to a cockpit winch. Using the winch for snubbing only (no winch handle), I got half a metre of drogue in

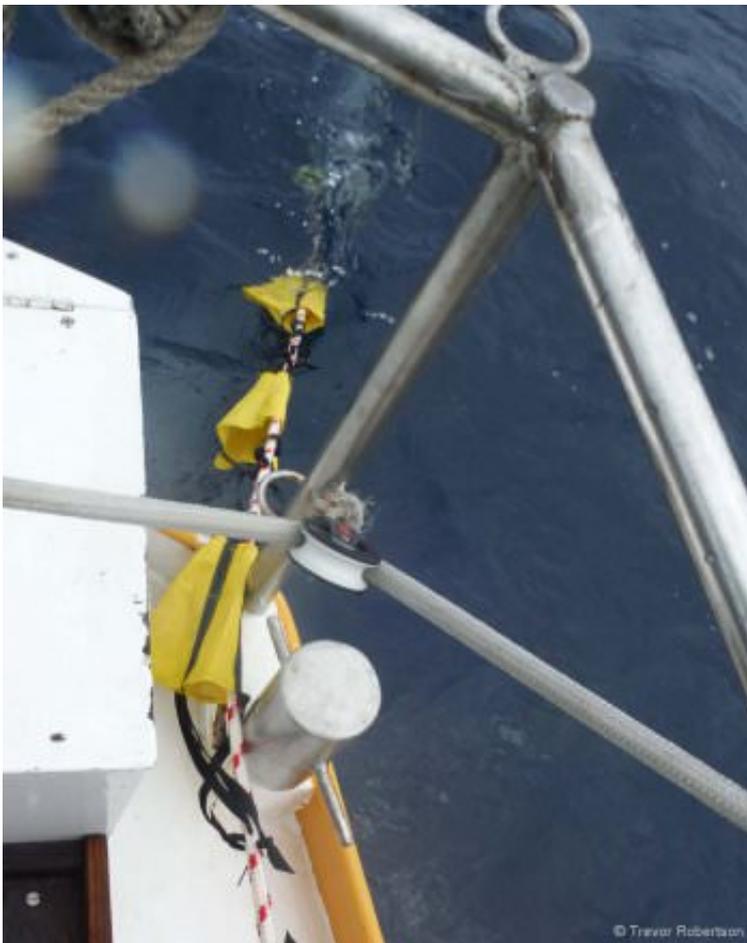
as the stern dipped on each wave.

When the rolling hitch reached the turning block, I:

1. belayed the drogue using a short line attached to the quarter,
2. slacked off the retrieval line and hauled it and the newly-retrieved length of drogue aft,
3. reattached the retrieval line with a rolling hitch,
4. took up the slack on the winch,
5. detached the short belaying line,
6. and repeated the exercise.

A vessel of *Iron Bark's* size gets 7 or 8 metres of drogue back on each cycle using this system; a larger vessel proportionately more, a centre cockpit vessel less.

Initially, I led the retrieval line directly to a cockpit winch. This had the lowest friction but meant the drogue streamed out almost abeam as I hauled it in, leaving *Iron Bark* rolling and lurching beam on to the old sea. Worse, I was trying to haul the boat sideways into the wind to get the drogue back—an impossibility.



Retrieving the drogue using the aft stanchion as a fairlead

So I led the retrieval line aft using the stern rail as a fairlead. This kept the drogue streaming astern and made hauling it in much easier. Using a stanchion or pushpit as a fairlead is fine on a metal vessel; a fibreglass or wood yacht might need to use something more substantially attached to the vessel.

Once the drogue was aboard, I flaked it into its bag ready to be used again, weighted tail end on top and bridle on bottom, but with the bridle ends showing and ready to attach to the stern bollards before deployment. Getting the bagged drogue down below was much harder than getting it out as the nylon double braid was now sodden and heavy.

Deployments Two and Three

I used the drogue on another two occasions before reaching Fremantle,

each time in winds that were only sustained force 8 (35-40 knots), perhaps just reaching force 9.

As the wind was fair I would normally have run on under storm jib or bare poles in those conditions, but by this time I was **over 100 days out from Newfoundland** and *Iron Bark's* bottom was so foul that the Aries could not cope, allowing her to broach repeatedly.

The drogue solved the problem of broaching at the cost of losing a day's run each time.

Slight Deterioration

I inspected the drogue on arrival in Fremantle and found a couple of the cones were slightly frayed, but not enough to be worth worrying about. At this stage the drogue had had a total of 32 hours, a little more than half of that time in gale conditions.

From Fremantle I sailed north and spent the southern winter poking around northwest Australia before returning to Fremantle. The return passage entailed thrashing 1600 miles to windward (sailing 2800 miles to do so), not the best point of sail for a smallish gaff cutter, but with no weather that could not be dealt with by heaving to. During this time I **built a deck locker for the drogue to eliminate the need to drag it up and down the companionway.**

More Roaring 40s

In December 2016 I left Fremantle hoping to get around Cape Horn to the Falklands before winter set in, with the option of diverting to Tasmania or New Zealand if I was delayed.

The passage would be largely in the Westerlies of the Southern Ocean and likely to be a rough one. I was 900 miles southwest of Cape Leeuwin and south of 45°S before I found the Westerlies, but then they filled in with a

bang and gale followed gale.

Although the first gale was only a sustained strong gale force 9 (40-45 knots) gusting 50 or 55 knots, I deployed the drogue, **as much for comfort and to get some rest**, as for safety. The wind dropped to below gale force after 12 hours but remained **too strong for me to get the drogue back in for another 14 hours**.

We were never heavily pooped...

The next depression was onto us within 24 hours and the wind quickly built to north-northwest violent storm force 11 (60-64 knots). I let the drogue out again and *Iron Bark* **ran steadily on with no sign of broaching**. The drogue sometimes held the stern down enough for the top of a wave to fill the cockpit but **we were never heavily pooped**.

The seas were huge, majestic and terrifying, and worthy of all that has been written about the greybeards of the Roaring Forties. They never cease to overawe me and **are far bigger than anything I have ever seen in the North Atlantic**.

Vane Gear Damage

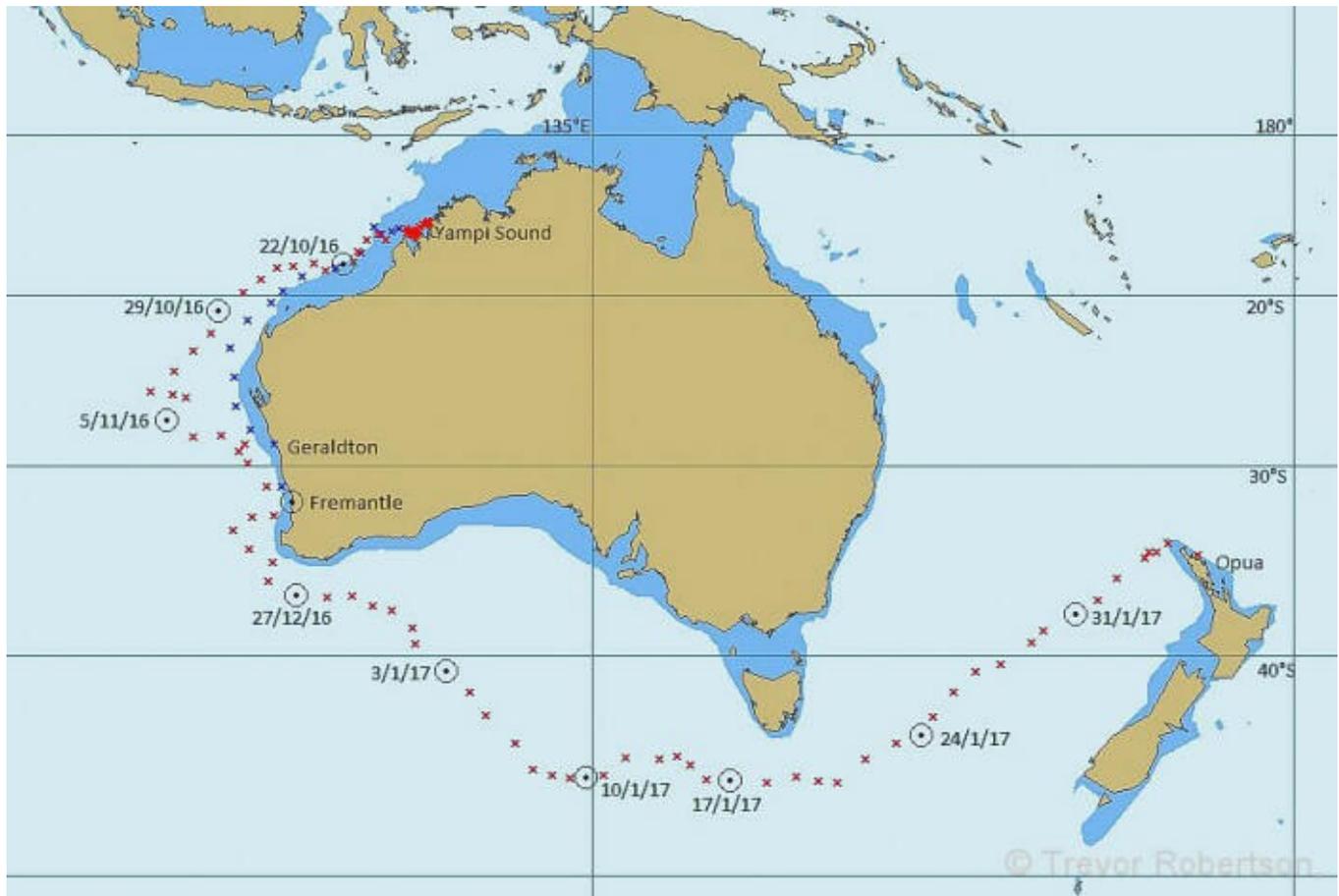
Some were so big that *Iron Bark* almost becalmed in the trough. When that happened the tension came off the drogue, and on three occasions there was enough slack for one leg of the bridle to take a turn around the Aries servo paddle. Twice I managed to free it; the third time I was not quick enough and the whole lower leg of the Aries was torn off.

The shear coupling in the Aries paddle proved to be stronger than the shaft it was meant to protect; clearly a design flaw in the Aries. In the short term the loss of the Aries did not matter as it was not connected and the tiller was lashed.

After 18 hours the wind eased enough for me to start retrieving the drogue.

It looked **quite ragged with many cones frayed and some completely burst.**

A Rethink



Having lost my self steering, I had to reconsider my route. Although I can get *Iron Bark* to steer herself on all points of sail without a self-steering gear this requires trimming the sails for balance rather than speed, which slows her down by about 1 knot. Getting around Cape Horn before the onset of winter was unlikely so I decided to divert to New Zealand.

I had barely made that decision before the next depression brought another force 11 severe storm. I deployed the drogue again, this time for 21 hours. **We rode through it safely, but I thought we ran a little faster than previously, presumably because many of the cones were damaged.** The drogue was certainly easier to retrieve because of the reduced drag from the damaged cones.



Damaged Cones

By this time three-quarters of the cones were moderately or severely damaged and the rest looked as if they would not last through another severe storm. This after 138 hours of use, a little more than half of which was in gale force or above—I cannot retrieve the drogue until the wind is below 30 to 35 knots, so there is a certain amount of waiting about in relatively benign conditions before I get it in.

Onward

Once clear of Tasmania, I turned north up the Tasman Sea and encountered three more gales before reaching Opua, New Zealand, 49 days from Fremantle. None of these gales exceeded force 9 (maximum sustained winds 45 knots) and *Iron Bark* rode them out hove-to without needing the drogue.

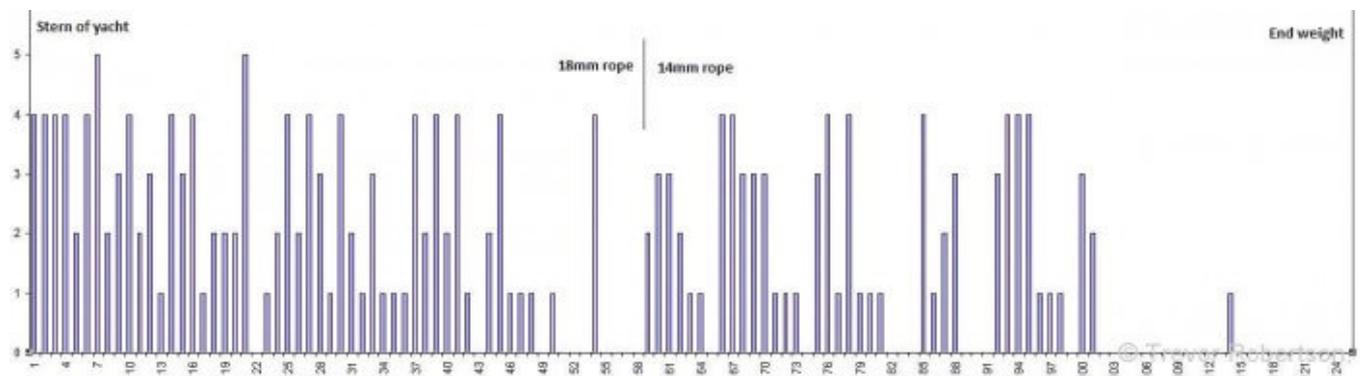
Failure Modality

The cones failed because they are made from a relatively coarsely-woven material with a rubber-like backing. The material relies to a considerable extent on this backing for its strength.

After a couple of uses **the cones nearest the vessel and those immediately downstream of the join between the 18-mm and 14-mm rope** (those subject to the most violent stress reversals) started to

shed their rubberised backing.

After another spell of bad weather, all the cones had shed their backing and those in the high-stress zones had burst. **After 138 hours of use, those that had not burst were on the point of doing so.**



An analysis of the cone damage.

Vertical axis is the amount of damage on a scale of 1:5.

Horizontal axis is cone numbers starting with number 1 being the cone nearest the boat.

Click to enlarge.

These cones from OceanBrake are very well made of substantial material, fully hemmed and the tapes are well attached. None of the stitching failed; **the failure was entirely in the material from which the cones are made.**

It may be that no material commonly available can withstand the repeated stress reversals to which these cones are subject in the prolonged bad weather of the Southern Ocean. It is certainly a topic that requires further research.

A Good Response

On arrival in New Zealand, I contacted Angus Coleman of OceanBrake and he immediately offered to do whatever was necessary to repair or replace the damaged cones without charge.

I thought this very generous and asked him to supply me with 60 replacement cones, which I will alternate with 6.5-oz sailcloth cones that I am buying from Dave Pelissier of [Ace Sailmakers](#). **This will let me compare the two types of cones.**

Not Looking For Trouble, But...

I do not go looking for bad weather and hope it will be a long while before I know which type does best in prolonged severe weather. However, heavy weather is common enough in the higher latitudes of the southern hemisphere (and I still have to get around Cape Horn) for it to be likely that I will have a chance to compare the two types of cones, whether I like it or not. I will report back if/when I do.

Problems and Possible Fixes

Vane Gear

Preventing the drogue from fouling the servo paddle on vessels fitted with a servo-pendulum steering gear is going to be different in each installation. The issue **is only likely in the Southern Ocean**, as waves large enough for a yacht to be becalmed in a wave trough rarely occur in the North Atlantic.

Attaching the drogue to chainplates that extend well aft of the transom may keep the bridle clear of the pendulum, but long chainplates are going to be subject to considerable lateral strains and require cross bracing. Various other solutions are possible; in my case it was to build a trim-tab self-steering gear that cannot foul, and to do away with the servo-pendulum entirely.

Cone Failure

The problem of cones bursting after repeated use is more intractable. The North Atlantic is a much less harsh place and the **OceanBrake cones**

would probably last indefinitely in those waters. The same is probably true of the 6.5-oz sailcloth cones made by Ace Sailmakers, but I do not yet have any experience with them.

Perhaps there is no material commonly available that is able to withstand the punishment dished out by repeated deployment in the Southern Ocean.

Series Drogues Work

In summary, **I think the series drogue is a valuable, perhaps life-saving, aid to small vessels in heavy weather.** It is worth its considerable cost and the nuisance of its weight and bulk, **despite the problem of the cones having a relatively short life.**

I will continue to carry one and do whatever it takes to keep it in good shape.

Further Reading

- [A more mechanised way to deal with the series drogue retrieval challenge](#)
- [More on series drogue durability problems](#)
- About [Iron Bark](#)
- Trevor's [excellent website about his cruises](#). Warning: You could spend a lot of time here, but we guarantee it won't be wasted
- [More detail about Trevor's non-stop voyage from Newfoundland to Australia](#)

Disclosure:

When I bought the original drogue from OceanBrake, I was given a discount. Similarly, the new cones bought from Ace Sailmakers were at a modest discount. I do not believe either of these discounts to be outside the normal range of commercial negotiations.

Publisher's Disclosure

OceanBrake are long-term corporate members and supporters of this site who [offer AAC members a discount](#).

Book Chapter Navigation:

[<< Jordan Series Drogue Durability Problems](#)

[Summary And Conclusions For Heavy Weather Book >>](#)