THE JORDON SERIES DROGUE

Please note that I do not consider myself an expert on the subject, rather a relative novice having deployed my JSD in anger only once. Nor is this to be seen as a user manual, it is not, merely a review of the JSD in the light of additional feedback from real life experiences from some incredible sailors. But I would suggest that any review that can boast input from FOUR ***CCA Blue Water Medallists*** *is probably worth reading.*

The catalyst for this review was a request for input on the JSD by Martin Thomas who is editing the new edition of the Imray guide to **"Heavy Weather Sailing".**

Steve Brown

Novara

February 2021

The **Jordan Series Drogue** is a safety device designed to prevent the capsize and total loss of both monohull and multihull sailing yachts and other vessels operating in the open ocean, in the event of a "worst case" breaking wave strike, as well as improving the motion of the boat in storm waves and to reduce drift.

Don Jordan was an aeronautical engineer and following the ill-fated 1979 Fastnet race began to research the various forms of drag devices and on completion of extensive research and tank testing in conjunction with the US Coast Guard, the **JSD** was developed.

It differed from conventional thinking in a number of ways, primarily that the drag device should be a drogue, tethered from the stern and should also consist of a large number of small cones to reduce the load on any one component. *(please follow the links at the end of this summary for further background details)*

U.S. Coast Guard conclusions - series drogue vs para anchor.

This paper (*the link is below)* documents the investigation of the use of drogues/sea anchors to prevent small sailing yacht capsize in breaking seas. The following conclusions were reached:

1. In many and possibly most cases, a properly engineered drogue can prevent breaking waves capsizing the vessel.
2. For fin keel sailing yachts the drogue/sea anchor should be deployed from the stern, not the bow.
3. A series type drogue provides significant advantages over a cone or parachute type drogue/sea anchor.
4. A full-scale series drogue demonstrated satisfactory handling and durability characteristics under simulated storm conditions and in actual breaking wave conditions.
5. A recommended design specification including design loads is presented for cone, parachute and series type drogues.

THE DROGUE DESIGN

It is possible to buy a made to order drogue or a kit that allows you to build the drogue yourself. But first you should ask yourself if you have the skills required to build the drogue to the specification and standards required! If not, you should consider if the costs saved are worth the risk of having the drogue fail when you need it most?

From both my own experience, and feedback from others, it is important that the drogue is specified to suit the vessel as the length of drogue, number of cones, distance between the bridle and first cone as well as the correct rope diameters have a direct bearing on its performance in use.

The JSD is a “one size fits all” solution for various wind strengths and wave heights and therefore the drogue should be over engineered to suit hurricane force winds with re-enforced anchor points, sufficient length between the bridle and the first cones and strong fabric used for the cones themselves. There is also some debate about how much weight is required to keep the JSD below the surface in all conditions. From the feedback from others and my own experience the weights suggested on the websites are on the light side and I and others have added extra weight to keep the drogue trailing below the surface. Also, each vessel is different in handling characteristics, layout, etc so a suitable method for storage, launch and retrieval for one boat may not suit another.

It is essential that the materials used on the cones can withstand the forces exerted

All shackles should be moused

ANCHOR POINTS

Significant forces are exerted by the drogue under load and anchor points should be substantial and for most fibreglass boats it is likely that both the deck and the cleats will need to be re-enforced.

Another option is to fix external plates outboard with re-enforced plates inboard

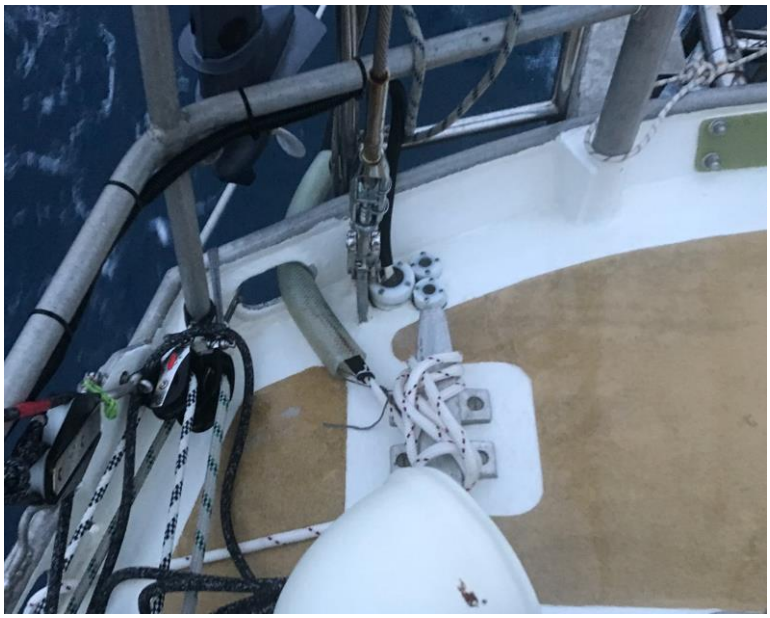
Susanne Huber-Curphey has 20mm thick and 90cm long aluminium plates welded to the hull to be used specifically as anchor points for her JSD.

Jeanne Socrates had the anchor point plates fitted during Nereida's build process

Novara's aluminium hull has substantial bollards. Note the chafe protection and figure of 8 loop to stop the bridle jumping the bollards when the load comes off the bridle.

CHAFE

Chafe is a serious problem and one that could lead to catastrophic failure and so it is essential that any possibility of chafe is eliminated. Adequate chafe protection should be used around the eyes on cleats and on the bridle as it exits fairleads and hawse holes.



STORAGE

Views differ on how best to store the JSD prior to use.

Some suggest that to avoid the clutter on deck and the possibility of degradation by UV that the drogue should be stored in a locker and brought out only when required.

Jeanne Socrates stored her drogue in the cockpit with the bridle set up but over time the UV degraded the Dynema to the point that it had to be replaced, she now protects the more vulnerable parts with UV protection covers.

UV degradation is concern so wherever possible the exposed sections of the bridle leg should be protected whenever the bridle is exposed to the sun.

Jeanne says *The bridle leg was NOT chafed - the damage was the result of deployment of JSD after months of UV exposure in S.Africa! The lesson learned the hard way - at the time, I understood that the Dyneema/Spectra line was UV-resistant (that's the blue finish on the line)*

Tony Gooch liked to keep decks as clear as possible and would only put the bridle in place when strong weather was forecast although *"I used the JSD on six weather engendered occasions. There was one time when I didn't, but should have, and it cost me the mast."*

LAUNCH TECHNIQUES

Once again there is differing views on how best to launch the JSD.

My own view is that it is better to have the drogue set up and ready to go and I have modified my own launch technique to have the drogue set up before leaving harbour when venturing into the more extreme conditions. The bridle is in place and zip ties used to keep it in position and stop a premature launch. The Drogue is flaked into a storage bag with a wide opening and the chain is attached and stored alongside in its own bag. It is then a simple procedure to drop the chain over the stern and the drogue then follows breaking the bridle zip ties when the strain comes on.

All of this is achieved with the crew standing inboard of the drogue eliminating any chance of being fouled by the lines or the lines fouling on an obstruction.

In all cases but especially for a single-handed sailor I would suggest that having the drogue ready to launch would give peace of mind and ensure the drogue is launched in good time.

Jeanne Socrates *supports this view* "I usually try to deploy well ahead of an imminent storm - makes it very easy so I can settle down to a meal and sleep - or read a book or get on with any urgent repairs."

Susanne Huber-Curphey *also has the JSD ready to launch but* strongly advocates a different method for launching "This is my well tested way of deploying the JSD: It is safe and easy, and I've done it while running under the storm jib with the self-steering holding course at up to seven knots of speed! It is a relaxed and safe way. So please do it the other way round: FIRST I slowly let out the bridle that is fixed to the transom. This will ensure that it clears the rudder and the self steering. THEN I slowly feed out the leader rope, while there is still very little force on the rope. I FEED out more rope slowly and under full control. Eventually I have the complete JSD in one huge loop streaming aft. There is still not very much force on the 'bitter end' at the chain that you are keeping with you in the cockpit. I fix this rope close to the chain around a winch or a cleat."

Then I take all the time I want. I lower the storm jib and swing up the paddle of the self steering or just admire the elements around me getting pretty angry. At this point half of the JSD is already slowing down the boat. I tie up the bag with the chain of the end-weight on a slip knot hanging outside against the top sides of the hull. The boat has already slowed down significantly, while maybe two thirds of the cones are streaming backwards behind the boat. To finally deploy or 'activate' the JSD I only pull the thin line of the slip knot. The weight of the chain lets it sink down vertically into the deep blue. I think there is no way of creating fouled droguettes, as the boat is still moving forward under reduced speed. Now I can totally relax, the boat and my live is safe! I clear the sails, clear the decks, clear the cockpit of clutter. Then I go below, have a cup of tea, relax and listen to the howling wind. Now the boat is happy, no matter how much more the barometer is tumbling. Breakers will be tumbling by, even a severe wind shift of the passing cold front sometime later is OK. The boat will roll a lot, but all is good. Wedge yourself into the sleeping bag and relax."

The downside to the first is that the run out of the drogue is uncontrolled and the load comes on quickly that can cause snatch.

The concern regarding the second method is that the skipper is hand feeding the drogue over the side although Susanne says that the forces are low until the chain is released and the drogue is at full extent.

NOTE* ***Susanne's*** *method has real merit and she came back to me again even more* forcibly *"I have used the JSD more than most ocean sailors during the last 19 years, a total of twelve times since 2002, six times were a remarkable 195 hours during the Longue Route 2018/19. I was shocked to discover*

how the sailors in the GGR 2018 were sailing their boats into the ground, most of them not even knowing of the JSD.

The first few times I started to deploy the JSD with the end weight first. Once it nearly cost me the complete Aries vane steering, as the bridle slipped under the body of the Aries when a breaker hit just as the JSD took the load. You know that the wind-self-steering system is most important, especially to single-handers."

THE JSD IN USE

My own experience of the JSD was excellent with Novara running safely and smoothly downwind with about 10 degrees of yaw to port and starboard. Life below was comfortable and we were able to cook, read and sleep for the 42 hours that the drogue was deployed, during which time we ran 82 nautical miles with breaking seas in excess of 9 metres and sustained winds well over 45 knots and gusts in excess of 65 knots.

Randall Reeves has deployed his JSD three times and I copy his account of the second of these.

"The second deployment came just S of the Crozet Island group in the following February and at the tail end of a big blow whose third knockdown shattered a pilothouse window. Winds were not as severe as we had already experienced off Cape Horn, but the seas were well beyond my experience—steep and breaking in trains of several hundred feet. I had struggled overnight to find a position relative to the seas (which were mostly lost in the darkness) that would allow Mo to make way safely. She was flying only a tiny storm jib. Two knockdowns occurred in the dark, one of which bent the starboard rail in over the winches and shattered its solar panel; the third at dawn came just after I'd gybed around, and its force took out the window.
After pumping the bilges and patching the window (or maybe before?), I deployed the JSD as a Hail Mary. No other solution had worked. What a relief! Mo was finally under control. During the deployment, the JSD snagged a winch, and I badly sprained my left wrist in attempting to free it before the full load of the drogue came on."

The big take-aways from this are two-fold.

1. **Randall** admits his use of the drogue is a last resort and that perhaps he should consider launching the drogue earlier.
2. It is ESSENTIAL that the launch technique GUARANTEES that the drogue cannot foul on any obstructions.

Tim Good

"I had my Ocean Brake JSD for around 4 years prior to needing it. I'd always have it setup in the cockpit during an offshore passage with the bridles attached to the chainplates. In 2020, on a passage to the Azores, I was caught in 50kt winds with abnormally steep breaking waves. My mainsail ripped down the middle and my engine packed in, preventing me from heaving-to under sail or motor. I deployed the drogue at 2am as a last resort. It was spectacular. Held in safe position, stern to the waves, I slept and ate well for 32 hours as the bad weather passed. The motion was also good enough for me to fix the engine. The singlehanded retrieval took around 1.5hrs and wasn't particularly strenuous. Best £1000 I've spent on the boat"

"*I feel the subject of end weight should be elaborated as not only does it need to remain below the surface but the JSD relies on this sinking and rising motion to allow the boat to accelerate and decelerate in the case of a wave. This takes a lot of shock out of the system. Too little weight might mean it remains below the surface but it would potentially not allow this process of deceleration. I actually found it quite hard to find the correct weight online as its not obvious on Oceanbrake or in Don's notes."*

RETRIEVAL

This is the area that worries potential JSD users the most, particularly single-handed sailors. Unless absolutely necessary it is worth waiting until wind and sea state reduces sufficiently to take as much load as possible off the drogue. When retrieving the drogue on Novara I put the engine into reverse to help take even more load off the line but not enough to have the line slack and risk fouling the prop.

Some users have expressed difficulty getting a rolling hitch or prussik knot to bite on the Dyneema bridle and suggest tying the retrieval line to the end of the bridle. On Novara the bridle legs are 25mm and using a 10mm Dyneema retrieval line I had no difficulties,

Tony Gooch also uses this technique.

"The load on the drogue is such that it is not worth trying to retrieve it until the wind has dropped to 15-20kn. First, let go one leg of the bridle and, using a rolling hitch, attach a line to the released leg and use this line on a winch to grind the bridle in. Next, use a rolling hitch to attach another line to the leading end of the drogue line and wind it in to the point where you have a couple of wraps of the drogue on a winch. In case anything slips, keep all lines and the bridle attached to the boat until all the drogue has been hauled aboard. When retrieving the drogue, it helps to run the engine in astern to take some of the strain off the drogue and make it easier to retrieve.

When using a winch to haul the drogue in be careful, because the cones tend to get caught in the line-stripper on the winch and tear. (he was single handed) You might find it easier to fold the cone as it goes on the winch – just watch your hands. It can take 60 to 90 minutes to retrieve the drogue."

KEY POINTS from my research

If the fear factor is removed and the methodology for use is simple and understood, then the skipper is more likely to launch the drogue before there is real danger to the boat and its crew.

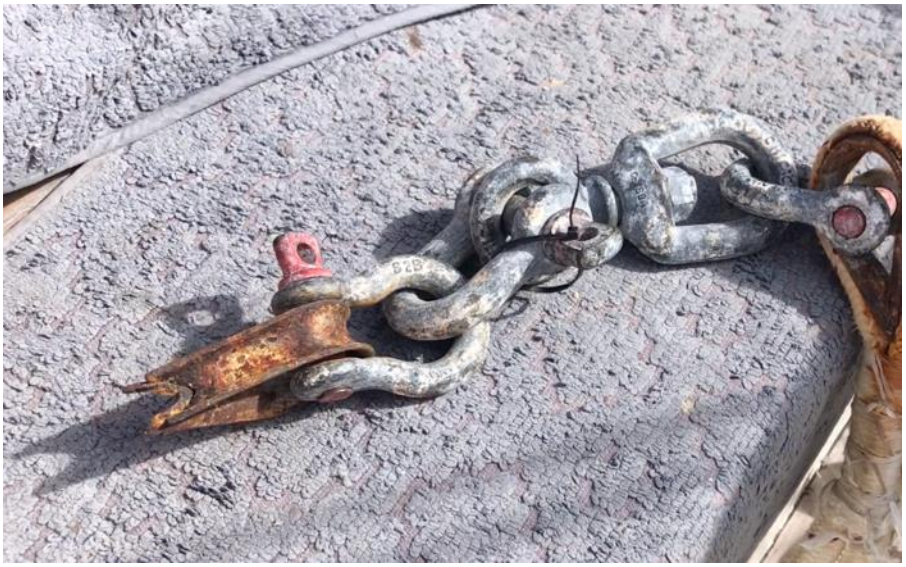
1. Understand the principles behind the drogue's design and use.
2. Err on the side of caution when calculating the number of cones and length of lead line between the bridle and first cone.
3. Earlier JSD's used a lighter weight material for the cones and many failed resulting in higher boat speeds, later drogues and kits use heavier weight material
4. Ensure the end weight is sufficient to keep the JSD below the surface at all times.
5. Ensure that the anchor points for the bridle are strong enough to withstand the forces exerted in extreme conditions and if in doubt re-enforce them. (*You should be able to hang your boat off them)*
6. Any shackles used should be moused to stop them coming undone.
7. All eye splices should have stainless steel *Thimbles* to stop chafe.
8. If possible prepare the drogue before leaving port with the bridles in place and secured to stop accidental launching with the drogue flaked into a firmly secured launch bag and the chain attached.
9. Eliminate ALL possible chafe points and add extra chafe protection where necessary, many skippers fabricate extension plates to move the anchor point aft of the stern.
10. If using a self-steering system consider the possibility of the bridle fouling the structure.
11. Have a bridle retrieval line with clove hitch / prusik knot set up to make retrieval quick and easy.
12. Practice launch and retrieval techniques with all crew
13. Do not wait until conditions become too extreme and unsafe to be on deck before launching the drogue.
14. Use the largest winch on board for recovery and if possible, hand tail the drogue on the winch waiting for slack on the line to make maximum progress with least effort.

FAILURES

Looking again at the various accounts I could find only 3 instances of failure and in each it was due to mistakes made by the skipper. One due to an old splice failure, one due to a shackle not being moused and the most serious was due to one or more knots failing. (the links should be spliced).

After retrieving the drogue on Novara I found that despite additional chafe protection one leg of the 25mm Dyneema bridle had chafed 50% of the way through. I now wrap plastic hose 30cm in length around the bridle legs as they exit the hawse hole.

Most drag devices spend their life stuffed in bags at the bottom of a locker, damp and mouldy. It is essential that you take as much care of the drogue as you do the rest of your boat (if not more) as this device may be called upon to save your life.



"A few hours later, I was still below and clearing away the carnage when I felt Mo's motion had changed. Suddenly we were lying ahull. I dashed on deck to find that only the bridle part of the JSD was still attached to the boat; the drogue had parted at the lead eye splice." **RR**

This eye splice failure on an older drogue could have been catastrophic

Additional References

ANALYSIS OF DROGUES AND SEA ANCHORS

https://dragdevicedb.com/

SUPPLIERS

OCEANBRAKE

www.oceanbrake.com

ACE SAIL MAKERS

http://www.acesails.com/

BACKGROUND INFO

https://www.jordanseriesdrogue.com/D_1.htm

https://www.jordanseriesdrogue.com/pdf/droguecoastguardreport.pdf

VIDEO LINKS

https://www.youtube.com/watch?v=97AERckmfn4&feature=youtu.be

Jeanne Socrates Yachting World article

https://www.yachtingworld.com/features/a-jordan-series-drogue-63180#:~:text=Jeanne%20Socrates%20%E2%80%93%20safe%20in%20breaking,storm%20conditions%2C%20especially%20breaking%20seas

Novara article in Yachting Monthly

https://www.yachtingmonthly.com/sailing-skills/learned-deploying-series-drogue-gale-66085